

Flora Malesianae Precursores XLVIII

A revision of Malesian Labiatae

by

HSUAN KENG

*Department of Botany
University of Singapore*

I. INTRODUCTION

Taxonomic accounts on the Labiatae from various parts of Malesia had been prepared by several authors such as Blume (Java), Miquel (Malay Islands), Prain (Malay Peninsula), Merrill (the Philippines), Backer and Bakhuizen van den Brink, Jr. (Java) and others. The present revision is an attempt to cover the whole Malesian region. It is mainly based on the materials accumulated in several leading herbaria. In some cases, as expected, a number of binomials proposed by different authors from separate geographical regions proved to be conspecific. Besides, some authors had a narrow concept of species; a number of species described by them, naturally has to be reduced either into the status of variety or form, or merely as synonyms. There are, however, some disturbing and puzzling problems that still remain to be solved.

The main part of this work was completed while I was on my study leave between November 1962 and May 1963. I am grateful to the authorities of the University of Singapore for granting the leave; to Prof. C.G.G.J. van Steenis, Director, Rijksherbarium, Leiden, and Sir George Taylor, Director, Royal Botanic Gardens, Kew, for the facilities generously afforded me while working in their respective institutions; and to the authorities of several other institutions to which I only paid very brief visit during the leave. My special thanks are due to Mr. H.M. Burkill, Director, Singapore Botanic Gardens, for the library and herbarium facilities kindly provided; to Dr. Bakhuizen van den Brink, Jr. and Prof. C.G.G.J. van Steenis of the Rijksherbarium, Leiden for going through the manuscript and for their numerous suggestions; and to many individuals who have kindly helped me in different ways: W.L. Chew (Singapore), L.L. Forman (Kew), R.E. Holttum (Kew), Ding Hou (Leiden), C.E. Hubbard (Kew), M. Jacobs (Leiden), J.H. Kern (Leiden), P. Leenhouts (Leiden), G. Lim (Singapore), W.T. Stearn (London), E.H. Walker (Washington, D.C.), R. Weibel (Geneva) and others. I also like to thank Mr. H.P. Chay, who typed the entire manuscript. Lastly, I would like to pay deserved tribute to my wife, Ro-siu Ling Keng for arranging the data of specimens which I have examined and copied and for her constant encouragement.

II. LABIATAE

Bl. Bijdr. (1826) 822; Benth. Lab. Gen. et Sp. (1832-36)* 1, in DC. Prodr. 12 (1848) 27, in Benth. & Hook. f. Gen. Pl. 2 (1876) 1161; Miq. Fl. Ind. Bat. 2 (1858-59)† 881; Hook. f. Fl. Brit. Ind. 4 (1885) 604; Briq. in Engl. & Prantl. Nat. Pflanzenfam. 4, 3a (1897) 183; Prain in J. As. Soc. Bengal 74, 2 (1907) ext. no. 699 (in King & Gambl. Mat. Fl. Mal. Pen.); Koord. Exk. Fl. Jav. 3 (1912) 139; Merr., Enum. Born. Pl. (1921) 519, Enum. Philip. Fl. Pl. 3 (1923) 408; Ridl., Fl. Mal. Pen. 2 (1923) 642, 5 (1925) 326; Kudo in Mem. Fac. Sc. & Agr. Taihoku Un. 2, 2 (1929) 37 (Lab. Sino-Jap. Prod.); Mansf. in Bot. Jahrb. 62 (1929) 376; Mukerj. in Rec. Bot. Surv. Ind. 14 (1940) 1 (Rev. Lab. Ind. Emp.); Back. & Bakh. f. Fl. Java, 2 (1965) 617.

Herbs, sometimes subshrubs or shrubs, glabrous, glabrescent or pubescent, usually aromatic; stem and branches usually 4-angled. Leaves mostly simple, opposite or sometimes whorled; exstipulate. Flowers mostly zygomorphic, axillary, in pairs, or in fascicled cymes which by union of two units form false whorls (or verticillasters) and, in many cases, agglomerate into spurious spicate, racemose, capitate or paniculate inflorescences. Calyx persistent, usually accrescent in fruit, nearly regular or unequally 4-5-toothed, tubular or 2-lipped. Corolla tube long or short, sometimes annulate within, the limb 5-, rarely 4-lobed, mostly 2-lipped and personate, the lobes always imbricate in bud. Stamens usually episorolline, 4 and didynamous, sometimes the upper (or posterior) pair imperfect, rarely, the lower (or anterior) pair degenerated instead (as in *Mosla*); anthers linear, ovoid or rounded, the locules parallel or divaricate, sometimes confluent or rarely dimidiate (as in *Anisomeles*) or disjoined by a slender connective (as in *Salvia*). Ovary superior, composed of 2 carpels each is 2-loculed by intrusion of ovary wall; style simple, sub-terminal, or mostly gynobasic; stigma usually 2-fid, the arms often unequal; ovules in each ovary-locule solitary, anatropous. Fruit of 4 dry or rarely fleshy (as in *Gomphostemma*), 1-seeded nutlets, sometimes one or more of these abortive, enclosed within persistent calyx; scar of attachment usually basal, small, sometimes lateral or sublateral and large. Seed small, erect or more or less transverse (as in *Scutellaria*), with very scanty or more commonly without endosperm.

* pp. 1-60, 1832; 61-322, 1833; 323-644, 1834; 645-783, 1835; i-lixviii, 1836 (cf. F. A. Stafleu, Literature (1967) p. 27).

† pp. 881-960, 1858; 961-1112, 1859 (cf. Van Steenis-Kruseman & Stearn, in Fl. Mal. 1, 4 (1954) p. ccii).

The family is predominantly a temperate one, composed of about 200 genera and 3200 species (*vide* Lawrence, Tax. Vas. Pl. 1951), of cosmopolitan distribution. About 32 genera and 85 species are native to or are more or less naturalized in Malesian region (including Sumatra, Malay Peninsula, Java, Lesser Sunda Islands, Borneo, the Philippines, Celebes, Moluccas and New Guinea). Species of several other genera, such as *Cedronella*, *Leonotis*, *Lavandula*, *Majorana*, *Marsypianthes*, *Nepeta*, *Pycnostachys*, *Rosmarinus*, *Thymus*, etc. (cf. Back. & Bakh. f. Fl. Jav. 2, 1965) are occasionally cultivated.

III. CLASSIFICATION

Two major schemes of classification on the Labiatae have been proposed. One is Bentham's (in DC, Prodr. vol. 12, 1848, and in Benth. & Hook. f. Gen. Pl. vol. 2, pt. 2, 1876) in which 6 tribes were established. Another one is Briquet's (in Engler & Prantl, Pflanzenfam. IV, 3a, 1897) in which 8 sub-families were recognized. Since the latter is an improved version of the former, therefore it is adopted in this treatment.

The 32 Malesian genera are classified under 5 subfamilies as follows. (Based on Briquet, 1897)

- A. Style not gynobasic; nutlets with lateral-ventral attachment, the usually large surface of contact often more than half the height of the ovary (seed without endosperm).

Subfamily 1. *Ajugoideae*

- A. Style gynobasic; nutlets with basal attachment and small surface of contact.

- B. Nutlets drupaceous with fleshy or strongly thickened exocarp and hard crustaceous endocarp.

Subfamily 2. *Prasioideae*

- B. Nutlets with dry and often thin pericarp.

- C. Seeds more or less transverse; embryo with a bent radicle lying on one cotyledon.

Subfamily 3. *Scutellarioideae*

- C. Seeds erect; embryo with short straight superior radicle; (disc-lobes when distinct alternate with ovary-lobes).

- D. Stamens ascending or spreading and projecting straight forwards.

Subfamily 4. *Stachyoideae*

- D. Stamens descending, lying upon or enclosed in the lower lip.

Subfamily 5. *Ocimoideae*

There are five Malesian genera which were mostly proposed after the publication of Briquet's monograph, and were not included in it. Three of them can be easily assigned to the following subfamilies.

Acrymia Prain (near *Cymaria* and *Ajuga*).....*Ajugoideae*

Nosema Prain (near *Mesona*).....*Ocimoideae*

Ceratanthus F. Muell. (near *Plectranthus*).....*Ocimoideae*

The taxonomic positions of the remaining two genera, *Eurysolen* Prain and *Paraphlomis* Prain, are rather debatable. Prain (1906) tentatively classified *Eurysolen* under Prasioideae (as Prasieae). Briquet (cited in Prain 1906) suggested it should belong to the Ajugoideae. The latter view was accepted by Mukerjee (1940) and Wu (1959). I find, however, its general habit, inflorescence and flowers structures are almost indistinguishable from those of the genus *Achyrospermum*, save some minute detailed flower characters and the more prominent surface of contact on the nutlets. In the following key I assign *Eurysolen* under the *Stachyoideae*, to which the genus *Achyrospermum* belongs.

Paraphlomis, on the other hand, is somewhat intermediate between Prasioideae and Stachyoideae. The leathery pericarp (although lacking a hard crustaceous endocarp) and the general habit of this genus bear strong resemblance to *Gomphostemma* of the Prasioideae. Yet the flower structures reveal its close affinities with such genera as *Phlomis*, *Pogostemon*, etc. of the *Stachyoideae*. In accordance with the previous authors, I assign it to the latter group.

Keys to the 32 Malesian genera under 5 subfamilies are presented below:

Subfamily 1. Ajugoideae

- A. Corolla seemingly 1-lipped, i.e., the 2 lobes of upper lip deeply divided, in association with 3 lobes of the lower lip bent downward and forming a single piece; flowers in pairs (in Malesian species) on spicate inflorescence.

32. *Teucrium*

- A. Corolla 2-lipped, the upper lip entire or 2-fid, the lower 3-lobed.
 B. Upper lip of corolla 2-fid, only half as long as the lower lip or much shorter.

- C. Herbs or undershrubs; stem woody; flowers in terminal and axillary compound cymes, generally congested into a large flat-topped panicoid clusters.

3. *Acrymia*

- C. Herbs; flowers in false whorls, axillary or in terminal spicate inflorescence.

4. *Ajuga*

- B. Upper lip of corolla entire or shallowly notched, arched, slightly shorter than the lower lip; shrubs; flowers in dichotomously branched cymes, the upper cymes often congested into conical, panicoid clusters.

10. *Cymaria*

Subfamily 2. Prasioideae

- 1 genus: 14. *Gomphostemma* (large herbs or subshrubs; nutlet drupaceous, usually fleshy and creamy white).

Subfamily 3. Scutellarioideae

1 genus: 30. *Scutellaria* (calyx-tube with a large shield or pouch-like appendage above the upper lip; two calyx-lips closed after flowering, later the upper lip falling off together with the appendage).

Subfamily 4. Stachyoideae

A. Stamens erect, divergent or spreading, but not ascending under upper lip of corolla; corolla almost actinomorphic; generally not or less clearly 2-lipped.

B. Anthers rounded, the locules confluent into 1 locule and becoming flat after dispersing pollen grains.

C. Corolla 4-lobed; stamens long exserted, the filaments bearded.

D. False whorls glomerate in stout, lax, usually interrupted simple or branched, spike-like inflorescence; 4 corolla-lobes subequal. the anterior one most prominent. 28. *Pogostemon*

D. False whorls aggregated in slender, dense continuous spike-like inflorescence; 4 corolla-lobes subequal. 11. *Dysophylla*

C. Corolla 4- or 5-lobed; stamens barely exserted, the filaments glabrous; false whorls aggregated in slender or stout, terete or secund spike-like inflorescence.

12. *Elsholtzia*

B. Anthers 2-loculate, the locules parallel or divergicate, never turn flat after dispersing pollen grains.

C. Calyx tubular, almost actinomorphic; stamens 4, the anther-locules parallel; false whorls axillary (in Malesian species) 19. *Mentha*

C. Calyx 2-lipped; functional stamens 2, the anther-locules divergicate; false whorls 2-flowered, secund, in raceme-like inflorescence. 22. *Mosla*

A. Stamens ascending under the upper lip of corolla; corolla always 2-lipped.

B. Anther-locules linear, solitary or separated by a filiform connective; stamens 2; upper lip of corolla often concave. 29. *Salvia*

B. Anther-locules rounded or ovoid; stamens 4.

C. Upper lip of corolla generally shorter, nearly flat, glabrous or pubescent.

D. Anthers reniform, with 2 more or less divaricate anther locules.

E. Calyx-tube more or less gibbous at the base, the nerves prominent, the upper lip sharply 3-toothed; corolla-tube nearly straight.

7. *Calamintha*

E. Calyx-tube straight, the nerves less prominent, the upper lip shallowly 3-toothed; corolla-tube long and recurved.

18. *Melissa*

D. Anthers ovoid, with 2 parallel anther locules.

E. Anthers uniform; anther-locules confluent; nutlets papillate, hispid or scaly.

F. Calyx tubular, nearly actinomorphic; corolla gibbous in front above the annulus; nutlets papillose-glandulate.

13. *Eurysolen*

F. Calyx campanulate, more or less 2-lipped; corolla neither gibbous nor annulate; nutlets hispid and scaly.

1. *Achyrospermum*

E. Anthers dimorphic, locules of the anterior longer pair dimidiate, 1-loculate, of the posterior shorter pair 2-loculate; nutlets smooth.

5. *Anisomeles*

C. Upper lip of corolla generally hooded, villous.

D. Calyx 8-10-toothed; upper lip of corolla short, hairy; lower lip very large.

17. *Leucas*

D. Calyx 5-spinous or 5-toothed.

E. Calyx 5-spinous; anther-locules parallel; leaves deeply incised.

16. *Leonurus*

E. Calyx 5-toothed; leaves entire or serrate, not incised.

F. Anther-locules divaricate when young, at length confluent; filaments hirsute; lower lip of corolla 3-lobed, the mid-lobe the narrowest.

21. *Microtoena*

F. Anther-locules divaricate, not confluent; filaments glabrous.

G. Herbs; calyx teeth unequal; lower lip of corolla 3-lobed, the mid-lobe the broadest.

31. *Stachys*

G. Subshrubs; calyx teeth nearly equal; lower lip of corolla 3-lobed, nearly equal.

26. *Paraphlomis*

Subfamily 5. Ocimoideae

- A. Lower lip of corolla comparatively short (usually not much longer than the upper), the mid-lobe thick-edged, recurved, sometimes saccate at the base; calyx subequally 5-toothed.

15. *Hyptis*

- A. Lower lip of corolla usually longer; calyx-teeth often very unequal, the limb mostly 2-lipped.

- B. Lower lip of corolla concave or boat-shaped, constricted at the base.

- C. Filaments free beyond the points of insertion on corolla-tube.

- D. Corolla-tube with a prominent posterior spur at the base; lower calyx-lip subtruncate.

8. *Ceratanthus*

- D. Corolla-tube straight or only gibbous at the base, not spurred; low calyx-lip 2-toothed.

27. *Plectranthus*

- C. Filaments connate at the base in a sheath around the

9. *Coleus*

- B. Lower lip of corolla patent, flat or slightly concave, broad-based.

- C. Lower lip of fruiting calyx seemingly 4-toothed (i.e. 2 lateral calyx teeth associated with the 2 lower ones and forming a 4-toothed piece); filaments included in corolla.

- D. False whorls in terminal or axillary globose or ovoid heads or cylindric dense spikes; corolla subequally 5-lobed.

2. *Acrocephalus*

- D. False whorls in axillary and terminal spurious racemes; corolla-limb 2-lipped.

6. *Basilicum*

- C. Lower lip of the fruiting calyx nearly entire or 2-toothed; filaments exserted.

- D. Lower lip of the fruiting calyx nearly entire.

- E. Two lips of fruiting calyx subequal in length, the tube deeply pitted by the presence of elevated cross veins between the main veins.

20. *Mesona*

- E. Upper lip of the fruiting calyx subentire; lower lip very short, the tube not pitted between the

23. *Nosema*

- D. Lower lip of the fruiting calyx sharply 2-toothed.

- E. Corolla-tube very short, not or slightly exserted; stigma 2-fid.

24. *Ocimum*

- E. Corolla-tube long, usually far exserted; stigma capitate or clavate, entire or subentire.

25. *Orthosiphon*

IV. LIST OF GENERA AND SPECIES FOUND IN MALESIA

1. *Achyrospermum* Blume (Stachyoideae)
 - a. *Achyrospermum densiflorum* Bl.
2. *Acrocephalus* Benth. (Ocimoideae)
 - a. *Acrocephalus indicus* O. Kuntz. (with 1 form)
3. *Acrymia* Prain (Ajugoideae)
 - a. *Acrymia ajugiflora* Prain
4. *Ajuga* Linn. (Ajugoideae)
 - a. *Ajuga bracteosa* Wall. ex Benth.
5. *Anisomeles* R. Br. (Stachyoideae)
 - a. *Anisomeles indica* O. Kuntz.
 - b. *A. salviaefolia* R. Br.
 - c. *A. malabarica* R. Br. ex Sims
6. *Basilicum* Moench (Ocimoideae)
 - a. *Basilicum polystachyon* Moench
7. *Calamintha* Mill. (Stachyoideae)
 - a. *Calamintha gracilis* Benth.
 - b. *C. umbrosa* Benth. (with 1 variety)
8. *Ceratanthus* F. Muell. ex G. Taylor (Ocimoideae)
 - a. *Ceratanthus longicornis* G. Taylor
9. *Coleus* Lour. (Ocimoideae)
 - a. *Coleus amboinicus* Lour.
 - b. *C. scutellarioides* Benth. (with 4 varieties)
 - c. *C. macranthus* Merr.
 - d. *C. spariflorus* Elmer
 - e. *C. galeatus* Benth. (with 1 variety)
10. *Cymaria* Benth. (Ajugoideae)
 - a. *Cymaria acuminata* Decne.
 - b. *C. dichotoma* Benth.
11. *Dysophylla* Blume (Stachyoideae)
 - a. *Dysophylla auriculata* Blume
 - b. *D. stellata* Benth. (with 1 variety)
12. *Elsholtzia* Willd. (Stachyoideae)
 - a. *Elsholtzia blanda* Benth.
 - b. *E. elata* Zoll. & Mor.
 - c. *E. pubescens* Benth.
13. *Eurysolen* Prain (Stachyoideae)
 - a. *Eurysolen gracilis* Prain (New distribution)

14. *Gomphostemma* Wall. ex Benth. (Prasioideae)
 - a. *Gomphostemma racemosum* Van Steenis ex H. Keng (New species)
 - b. *G. microcalyx* Prain
 - c. *G. parviflorum* Wall. ex Benth.
 - d. *G. crinitum* Wall. ex Benth.
 - e. *G. hemsleyanum* Prain ex Coll. & Hemsl.
 - f. *G. curtisii* Prain
 - g. *G. javanicum* Benth.
 - h. *G. scortechinii* Prain
15. *Hyptis* Jacq. (Ocimoideae)
 - a. *Hyptis brevipes* Poit.
 - b. *H. rhomboidea* Mart. & Gal.
 - c. *H. spicigera* Lamk.
 - d. *H. pectinata* Poit.
 - e. *H. suaveolens* Poit.
16. *Leonurus* Linn. (Stachyoideae)
 - a. *Leonurus sibiricus* Linn.
17. *Leucas* R. Br. (Stachyoideae)
 - a. *Leucas aspera* Link.
 - b. *L. zeylanica* R. Br.
 - c. *L. lavandulifolia* Sm.
 - d. *L. javanica* Benth.
 - e. *L. mollissima* Wall. ex Benth.
 - f. *L. flaccida* R. Br.
18. *Melissa* Linn. (Stachyoideae)
 - a. *Melissa axillaris* Bakh. f.
19. *Mentha* Linn. (Stachyoideae)
 - a. *Mentha arvensis* Linn. var. *javanica* Hook. f.
20. *Mesona* Blume (Ocimoideae)
 - a. *Mesona palustris* Bl.
 - b. *M. philippinensis* Merr.
21. *Microtoena* Prain (Stachyoideae)
 - a. *Microtoena insuavis* Prain ex Briq.
22. *Mosla* Buch.-Ham. ex Maxim. (Stachyoideae)
 - a. *Mosla dianthera* Maxim.
 - b. *M. formosana* Maxim.
23. *Nosema* Prain (Ocimoideae)
 - a. *Nosema clausa* (Merr.) H. Keng (New combination)
 - b. *N. cochinchinense* Merr. (New distribution)

24. *Ocimum* Linn. (Ocimoideae)
 - a. *Ocimum americanum* Linn.
 - b. *O. basilicum* Linn.
 - c. *O. gratissimum* Linn.
 - d. *O. sanctum* Linn.
25. *Orthosiphon* Benth. (Ocimoideae)
 - a. *Orthosiphon aristatus* Miq.
 - b. *O. thymiflorus* v.d. Sleesen
26. *Paraphlomis* Prain (Stachyoideae)
 - a. *Paraphlomis javanica* Prain
 - b. *P. oblongifolia* Prain
27. *Plectranthus* L'Hérit. (Ocimoideae)
 - a. *Plectranthus javanicus* Benth.
 - b. *P. teysmanni* Miq.
 - c. *P. petraeus* Backer ex Adelb.
 - d. *P. steenisii* H. Keng (New species)
 - e. *P. apoensis* (Elmer) H. Keng (New combination)
 - f. *P. congestus* R. Br.
 - g. *P. parviflorus* Willd.
 - h. *P. klossii* S.M. Moore
28. *Pogostemon* Desf. (Stachyoideae)
 - a. *Pogostemon heyeanus* Benth.
 - b. *P. tomentosus* Hassk.
 - c. *P. cablin* Benth.
 - d. *P. reticulatus* Merr.
 - e. *P. philippinensis* S.M. Moore
 - f. *P. menthoides* Bl.
 - g. *P. velatus* Benth.
29. *Salvia* Linn. (Stachyoideae)
 - a. *Salvia scapiformis* Hance
 - b. *S. plebeia* R. Br.
 - c. *S. coccinea* Juss. ex Murr. var. *Pseudo-coccinea* Back.
30. *Scutellaria* Linn. (Scutellarioideae)
 - a. *Scutellaria discolor* Wall. ex Benth. (with 1 variety)
 - b. *S. indica* Linn.
 - c. *S. javanica* Jungh. (with 3 varieties)
31. *Stachys* Linn. (Stachyoideae)
 - a. *Stachys melissaefolia* Benth.
32. *Teucrium* Linn. (Ajugoideae)
 - a. *Teucrium quadrifarium* Buch.-Ham.
 - b. *T. viscidum* Bl.

V. TAXONOMIC TREATMENT

1. *ACHYROSPERMUM* BL.

Achyropermum Blume, Bijdr. (1826) 840; Benth. in Benth. & Hook. f. Gen. Pl. 2 (1876) 1208; Briq. in E. & P. Pfl. Fam. 4, 3a (1897) 268.

Undershrubs or herbs. Stems and branches terete, obscurely 4-angled, pubescent. False-whorls few-flowered, usually forming terminal, spike-like inflorescence. Calyx 10-nerved, tubular-campanulate, 5-toothed, $\pm$ 2-lipped, the upper lip slightly longer. Corolla slender, 2-lipped, the upper (or posterior) lip short, erect, notched; the lower (or anterior) 3-lobed, the mid-lobe often concave. Stamens 4, ascending, in 2 pairs, the lower (or anterior) pair longer; anthers 2-loculate, the locules parallel. Styles briefly 2-fid. Nutlets scaly and chaffy on the ventral surface and on the top, rough and pubescent on the dorsal surfaces.

Over 10 species, from tropical E. Africa, Madagascar and Seychelles through Indo-Himalaya to Malesia; 1 in Malesia.

1. **Achyropermum densiflorum** Bl. Bijdr. (1826) 840; Benth. in DC. Prodr. 12 (1848) 458; Miq. Fl. Ind. Bat. 2 (1859) 989; Hook. f. Fl. Brit. Ind. 4 (1885) 673, in nota; Merr. Enum. Philip. Fl. Pl. 3 (1923) 412; Back. & Bakh. f. Fl. Java 2 (1965) 624.

Achyropermum phlomoides Bl. l.c. 841; Miq. l.c. 990. *syn. nov.*

Achyropermum philippinense Benth. in DC. Prodr. 12 (1848) 458; Miq. Fl. Ind. Bat. 2 (1858) 990; Vidal, Rev. Pl. Vasc. Filip. (1886) 214.

A herb, suberect, 30–60 cm high. Stems and branches pubescent. Leaves thin membranaceous, narrowly elliptic or ovate, 6–8 cm long, 2.5–4 cm wide, acute, or broadly acute, the base cuneate or attenuate, hirsute or pilose on both surfaces, the margins serrate or crenate-dentate. False-whorls always forming terminal, spike-like inflorescence, 4–6 (or more) cm long; bracts broadly ovate or spatulate, 6–8 mm long, pilose and ciliate. Calyx campanulate, 6–8 (in fruit 8–10) mm long, more or less 2-lipped, the upper lip 2-toothed, slightly longer than the lower lip, the teeth straight (in fruit often slightly recurved), obtuse or rounded at the apex. Corolla 3–4 mm exceeding the calyx, the upper lip erect, the lower lip much longer than the upper one, straight or decurved. Stamens in 2 pairs, the lower pair longer, exserted. Nutlets obtusely trigonous, 1.2 mm long 0.5 mm wide, scaly and chaffy on the ventral surfaces and the top, rough and pubescent on the dorsal surface.

Type: “Circa Linga Jattie Prov. Cheribon” (Blume) (not seen).

Distribution: Malesia (Sumatra, Java, Lesser Sunda Isls. and the Philippines).

Ecology: In forests often along streams and in damp places at low and medium altitudes from 500 to 1600 m.

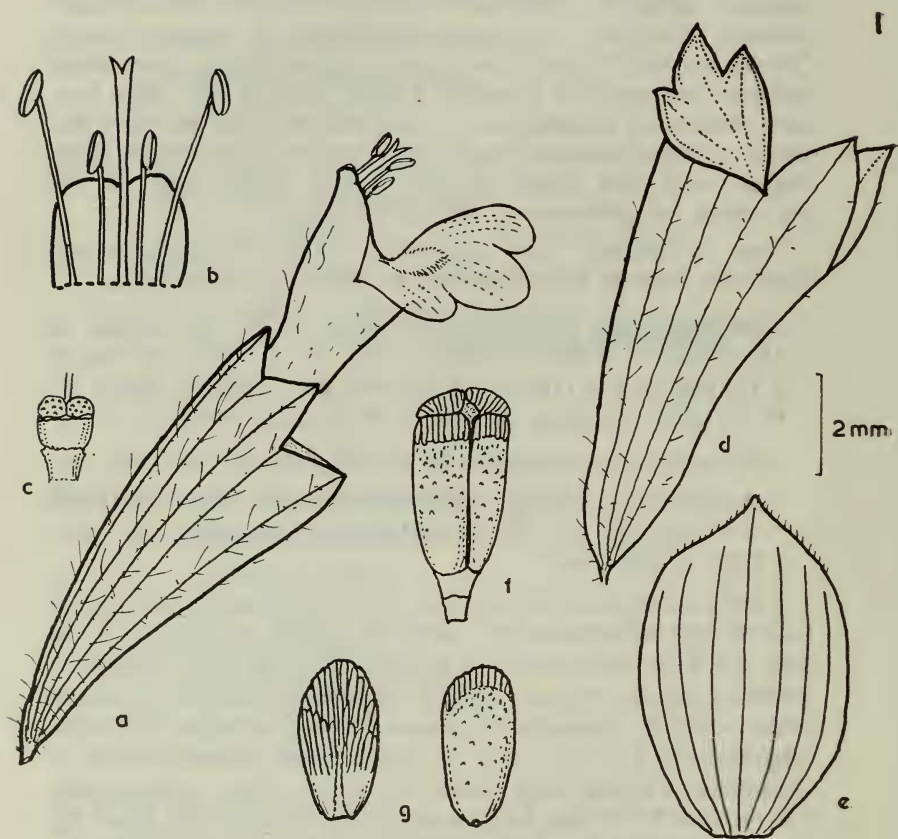


Fig. 1. *Achyrospermum densiflorum* Bl.

a. flower; b. portion of upper corolla-lip with stamens and style;
c. ovary and nectary disc; d. fruiting calyx; e. bract; f. 4 nutlets;
g. nutlet in 2 views. (flower, Smith 880; fruit, Elmer 8709)

Specimens examined:

Sumatra: Sungai Kumbang, alt. 1,500 m., *Robinson & Kloss 106* (BM); Benkoelen, Kaba, *Voogd 1367* (L).

Java: G. Kendeng, alt. 800 m., *Bakhuizen v/d Brink Jr. 2847* (L); Java, *Jungkuhn 5 & 29* (K); Garoet, Danau Tjiharoes, Kamodjan, alt. 1,500 m., *Docters Van Leeuwen 13288* (L); G. Toegoe near Tjampaka, alt. 1,000 m., *Smith s.n. June, 1923* (L); Batavia, Pondok Walanda, G. Kendeng, alt. 1,000–1,520 m., *Steenis 12213* (L, Sing.); Tjadas Malang near Tjidadap, alt. 1,000 m., *Winckel 1181* (K,L); Tjadas Malang near Tjibeber, alt. 1,000 m., *Winckel 1457* (L); Java, *Zollinger 3476* (BM) (plant 10 cm. high).

Lesser Sunda Islands: Lombok, alt. 750–900 m., *Elbert 863* (L); Lombok, alt. 1,250–1,600 m., *Elbert 1779* (K,L); Lombok, alt. 200–400 m., *Elbert 2448* (L); Lombok, G. Poenikan, *Ernst s.n. March 1906* (L); Lombok, Poesoeh Pass, Sembalong, alt. 1,300 m., *Voogd 2083* (L, Sing.); West Soembawa, alt. 500 m., *Voogd 2564* (L).

Philippines: Leyte, Ormoc, Lake Danao, *Edano 11988* (L); Leyte, Ormoc, Mt. Janagdan, *Edano 12075* (Sing.); Luzon, Benguet, Baguio, *Elmer 8709* (K,L) (fls. pink); Mindanao, Davao, Todaya, Mt. Apo, *Elmer 11699* (K,L); Luzon, Benguet, Sablang, *Fenix 12760* (L); Banquet, *Loher 4212 & 6574* (K) (bract rosea, corolla roseo-lilac); Luzon, Laguna, *Mabesa 25389* (L); Luzon, Laguna, *Merrill 5101* (K); Luzon, Rizal, *Ramos 2035* (L, Sing.); Luzon, Benguet, Rio Trinidad, *Ramos 5567* (L); Luzon, Cagayan, Penabalanca, *Ramos 76766* (Sing.); Mt. Maquiling, *Vidal s.n. March, 1886* (K) (Type of *Achyropermum philippinense* Benth.).

Type specimen of *A. phlomoides* Bl. ("Sylvia altioribus humidis montis Burangrang") could not be traced. The only specimen in the Leiden herbarium, collector unknown, with collection number as 1437 (*Herb. Lugd. Bat. No. 909–105, 231*) bearing Blume's handwriting as *Achyropermum phlomoides* is clearly a specimen of *A. densiflorum* with underdeveloped terminal spicate inflorescences.

2. ACROCEPHALUS BENTH.

Acrocephalus Benth. in Bot. Reg. sub. tt. 1282, 1300 (1829), in Benth. & Hook. f. Gen. Pl. 2 (1876) 1173; Briq. in E. & P. Pfl. Fam. 4, 3a (1997) 365.

Annual herbs. Stems and branches quadrangular. Leaves opposite or falsely whorled by the presence of the leaves of underdeveloped lateral branchlets. False whorls agglomerated into terminal or axillary globose or ovoid spurious heads or cylindric spurious spikes; bracts imbricate. Flowers very small, sessile, Calyx ovoid (in fruit tubular), 7-nerved, the base slightly gibbous; upper lip flat, entire; lower lip generally 4-toothed (in Malesian species); throat naked. Corolla tube very short, subequally 5-lobed. Stamens 4, declinate; filaments free, toothless, included; anthers reniform, the locules confluent. Disk small, gibbous. Style 2-fid. Nutlets minute, smooth or glandulate.

Species about 30, subtropical and tropical Asia (Malesia, E. India to S. W. China) and Africa (and Madagascar). However, in a recent monographic work, all the African species are segregated

into several independent genera (cf. Morton in Hutchinson & Dalziel, Fl. W. Trop. Afr. 2 (1963), p. 445). As a result, only 5–6 Asiatic species remain in the genus; 1 species with 1 form occurs in Malesia.

1. **Acrocephalus indicus** (Burm. f.) O. Kuntz. Rev. Gen. Pl. (1891) 511; Merr. in Philip. J. Sc. 7 (1912) Bot. 101, Enum. Philip. Fl. Pl. 3 (1923) 421; Kudo in Mem. Fac. Sc. Agr. Taihoku Imp. Univ. 2 (1929) 109; Mukerj. in Rec. Bot. Surv. Ind. 14, 1 (1940) 29; Back. & Bakh. f. Fl. Java 2 (1965) 638.
Prunella indica Burm. f. Fl. Ind. (1768) 130.
Ocimum capitellatum Linn. f. Suppl. (1781) 276.
Ocimum capitatum Roth, Nov. Pl. Sp. (1821) 276.
Ocimum acrocephalum Bl. Bijdr. (1826) 834.
Lumnitzera capitata Spreng. Syst. 2 (1825) 687.
Lumnitzera acrocephala Zipp. in Herb. Lugd. Bat. (Leiden).
Orignum benghalense (non Burm.) Bl. Bijdr. (1826) 831.

Acrocephalus capitatus (Roth) Benth. Bot. Reg. sub. tt. 1282, 1300 (1829), in Wall. Pl. As. Rar. 2 (1831) 18, Lab. Gen. & Sp. (1832) 23, in DC. Prodr. 12 (1848) 47; Miq. Fl. Ind. Bat. (1856) 941; Hook. f. Fl. Brit. Ind. 4 (1885) 611; Ridl. Fl. Mal. Pen. 2 (1923) 644.

Acrocephalus blumei Benth. Lab. Gen. & Sp. (1832) 23.

A slender annual herb, 15–50 cm high. Stems quadrangular, glabrous, often branched from the base; branches often ascending. Leaves elliptic to narrowly lanceolate, 2–5.5 cm long, 0.5–1 cm wide, acute, the base attenuate, the margins remotely serrate, glabrous or glabrescent on both surfaces. Flowers in terminal and upper axillary spurious heads, 5–15 mm across, subtended at the base with 2 or several leafy bracts; flowering bracts suborbicular. 2–3 mm in diameter, shortly acuminate, each bract subtending 3–6 flowers. Calyx tubular, 2–2.5 mm (in fruit 4.5–5 mm) long, pubescent externally, 2-lipped; upper lip entire, rounded; lower lip with 4 lanceolate teeth, shorter than the upper lip. Corolla tubular, 3 mm long, suberect, inconspicuously 2-lipped; upper lip shortly 4-lobed, the lower lip entire, longer than the upper lip. Stamens 4, in 2 pairs, epipetalous. Nutlets minute, oblong-ellipsoid, 0.7 mm long, 0.4 mm broad, compressed, smooth.

Distribution: India, Thailand, Indo-China to S. China and Malesia.

Ecology: In open sandy places or in grassland, sometimes ascending to 1,200 m. altitude.

Vern. name: Sangketan rambat (Java; fide Koorders).

Specimens examined:

Sumatra: Sumatra, *Jacob* 6 (L); Sumatra *Korthals* s.n. (L) (several collections); Karo, Kabandjahe, alt. 1,225 m., *Lörzing* 6197 (L); Habinsaran, alt. 1,200–1,250 m., *Lörzing* 6549 (L); Karo, Kabandjahe, alt. 1,100 m., *Lörzing* 13555 (L); Gajo, Loeäs, *Pringgo Atmodjo* 102 (L) (“Beberteh”).

Malay Peninsula: Pahang, *Ridley* s.n. 1891 (Sing.).

Java: Bantam, alt. 5 m., *Backer* 1493 (L); Bantam, alt. 200 m., *Backer* 9259 (L); Java, *Blume* 974 (L) (Lectotype of *Ocimum acrocephalum* Bl.) (Herb. *Ludg. Bat.* 904, 350–17) (several collections); Besoeki, *Buwalda* 7398 (L); Bawean, *Dorgelo* 82 (L); Java, *Horsfield* lab. 18 (K); Java, *Junghuhn* 48 & 52 (L) (several collections); Ngarengan, *Koorders* 33556 B (L); Java, *Kuhl & Hasselt* s.n. (L); Java, *Reinwardt* s.n. (L); Indramajoe, Plosokerep, alt. 25 m., *Steenis* 8202 (L); Java, *Zollinger* 106 (K); Madoera, *Zollinger* s.n. (L).

Lesser Sunda Islands: W. Sumbawa, Mt. Batulante, alt. 500–700 m., *Kostermans* 18854 (L); N. Bali, *Steenis* 7740 (K); Bali, alt. 400–500 m., *Voogd* 2446 (L).

Borneo: Bandjermassing, *Motley* 354 (K); Borneo, *Nieuwenhuis & Jaheri* 36 (L).

Philippines: Mindanao, Zamboanga, alt. 400 m., *Frake* 36182 (L); Luzon, Tarlac, *Merrill* 3622 (K); Luzon Benguet, *Merrill* 4384 (K); Luzon, Bulacan, *Ramos* 1986 (Sing.) & 1996 (L); Luzon, Rizal, Mt. Irig, *Ramos* 41970 (K, L, Sing.); Luzon Bontoc, *Vanoverbergh* 923 (Sing.);

Celebes: P. Muna, alt. 125 m., *Elbert* 2908 (L); P. Muna, alt. 75 m., *Elbert* 2926 (L).

New Guinea: Papua, near Guruguru village, alt. 25 m., *Hoogland* 4227 (L).

1a. *Acrocephalus indicus* (Burm. f) O. Kuntz. f. *spicatus* (C. B. Robinson) *stat. nov.*

Acrocephalus spicatus C. B. Rob. in Philip. J. Sc. 6 (1911) Bot. 356; Merr. Enum. Philip. 3 (1923) 421.

Acrocephalus dentatus C. B. Rob. in Herb. Kew.

This form is different from the species in the aggregation of 6–8 or more false whorls into a spurious spike which sometimes reach a length of 3–4 cm long.

Type specimen: Santa Cruz, Davao, S. E. Mindanao, *Williams* 2954 (co-type, K).

Distribution: Malesia (Mindanao, the Philippines).

Ecology: In open, rather wet places at low and medium altitudes (fide Merrill.).

Specimens examined:

Philippines: Mindanao, Bukidnan, Tanculan, *Fenix* 26115 (BM,K); Mindanao, Bukidnan, Maluko, *Ramos & Edano* 38460 (K) (Type of *Acrocephalus dentatus* Rob.); Mindanao, Davao, Santa Cruz, *Williams* 2954 (K) (Type of *Acrocephalus spicatus* Rob.).

As the flower and fruit structures of this plant are indistinguishable from those of the species, and in rare cases, as in *Ramos* 41970 (K), a specimen collected from Mt. Irig, Rizal, Luzon in Feb. 1923, both “capitate” and “spicate” inflorescences occur in a same plant, therefore I reduce Robinson’s species as representing a form of *Acrocephalus indicus* O. Kuntze.

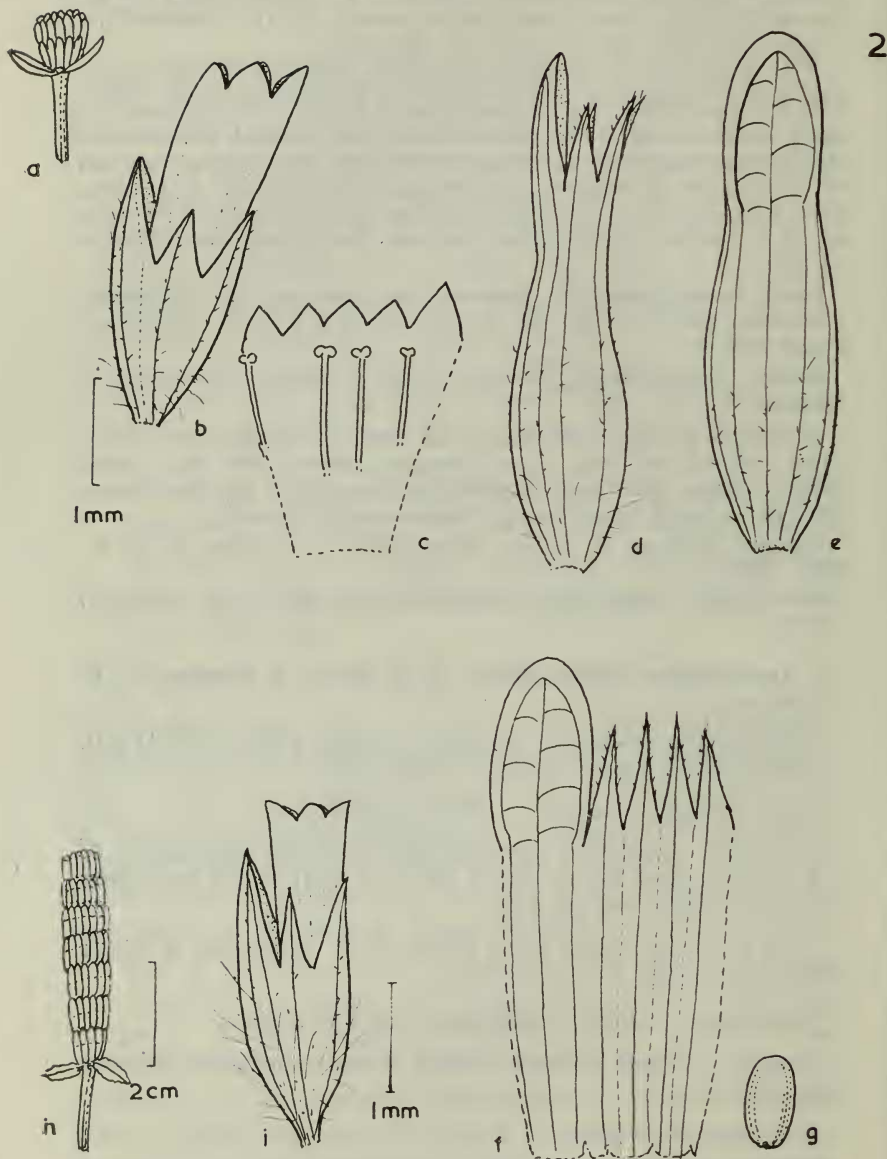


Fig. 2. *Acrocephalus indicus* O. Kuntz. (a-g) and *f. spicatus* (h & i).

a diagram of the spurious head; b. flower; c. corolla expanded; d. & e. fruiting calyx in 2 views; f. fruiting calyx, expanded; g. nutlet; h. diagram of the cylindric inflorescence; i. flower. (a-g, Motley 354, h & i, Ramos and Edano 38460)



Plate 1. *Acrymia ajugiflora* Prain, in Kanching Forest Reserve, Selangor, Malay Peninsula.

"The flowers are white with a dark red throat, and they open about one at a time on a cyme. The leaves are dark green with a velvety pile and pale view which makes them rather handsome . . . It is growing in company with *Phyllagathis hirta* and other forest floor melastomataceous herbs, and with *Didymocarpus*, and at one spot right at the foot of the quartz cliff with *Argostenma pictum* . . . It is restricted to quite a narrow zone on the slope below the cliff, in an area a few hundred yards square . . ."

Photographed by J. A. Reid, June, 1953.

3. **ACRYMIA** PRAIN

Acrymia Prain in Kew Bull, 1908 (1908) 114.

A herb or undershrubs. Leaves opposite, petiolate. Flowers small, in terminal and axillary, many-flowered, pedunculate, compound cymes. Calyx subcampanulate, 8-nerved, 5-toothed, the teeth subequal; throat naked within. Corolla shortly exserted; tube slightly enlarged upwards; limb 2-lipped, the upper lip suberect, or recurved, 2-fid, the lower lip 3-lobed, spreading, the midlobe larger than the lateral ones. Stamens 4, exserted, in 2 pairs, the upper pair slightly shorter; anthers reniform, 2-loculate, at length confluent. Disk small, equal, entire. Style briefly 2-fid, the upper branches very short. Nutlets obovoid, rugose and hirsute; scar very large, lateral.

Monotypic, endemic to Malesia (Malay Peninsula: Perak, Selangor).

1. **Acrymia ajugiflora** Prain in Kew Bull. 1908 (1908) 114, in Hook. f. Icon. Pl. 30 (1911) t. 2946, in J. As. Soc. Beng. 74 (1908) 878; Ridl. Fl. Mal. Pen. 2 (1923) 654.

A herb or undershrub. Stem woody, prostrate and rooting below, densely leafy above. Leaves thin chartaceous, elliptic to broadly elliptic, 15–20 cm long, 10–12 cm wide, obtuse, the base broadly acute or subtruncate, the margins irregularly serrate or doubly serrate, hirsute and strigose on both sides, especially along the main nerves; petioles 3–4 cm long, hirsute and strigose. Compound cymes dichotomously branched, with terminal flowers; flowers on the branches secundly arranged; peduncles slender, 6–8 cm long; bracteoles subulate, shorter than the pedicels. Calyx campanulate, 2.5–3 mm long (in fruit 3–4 mm long), the teeth triangular, subequal in length, ciliate; pedicels slender, strigose, 2–3 mm long. Corolla 6–7 mm long, glabrous; the upper lip suberect or recurved, 2-lobed, the lobes oblong; lower lip spreading, 3-lobed, the midlobe very large, obovate to orbicular. Anthers 2-loculate, at length confluent; filaments exserted, hirsute only at the base, glabrous elsewhere. Nutlets obovoid sub-triquetrous, 1.2–1.5 mm long, 1 mm broad, rugose, sparsely hirsute.

Type: Perak, Malaya, *Kunstler* (Dr. King's collector) 10709 (K).

Distribution: Endemic to Malesia (Malay Peninsula: Perak, Selangor).

Ecology: On forest floor at the foot of cliff, or on limestone rocks.

Specimens examined:

Malay Peninsula: Perak: *Kunstler* (Dr. King's collector) 10709 (K, Type); Selangor, Rawang *Melville* 4747 (K); Kanching Forest Reserve, *Nur* 34334 (K, L, Sing.), *Reid* s.n. June, 1953 (Sing.), *Ridley* s.n., Dec. 1920 (K), *Steenis* 18509 (L) (corolla pale sulphur, endlobe white, tube dark red).

An unique herb, as Prain pointed out, resembles *Cymaria* (inflorescence, fruit), *Ajuga* (corolla) and *Gomphostemma* (habit) with regard to certain characters as indicated within the brackets. The calyx is clearly 8-nerved, instead of 10-nerved as stated in the original description.

3

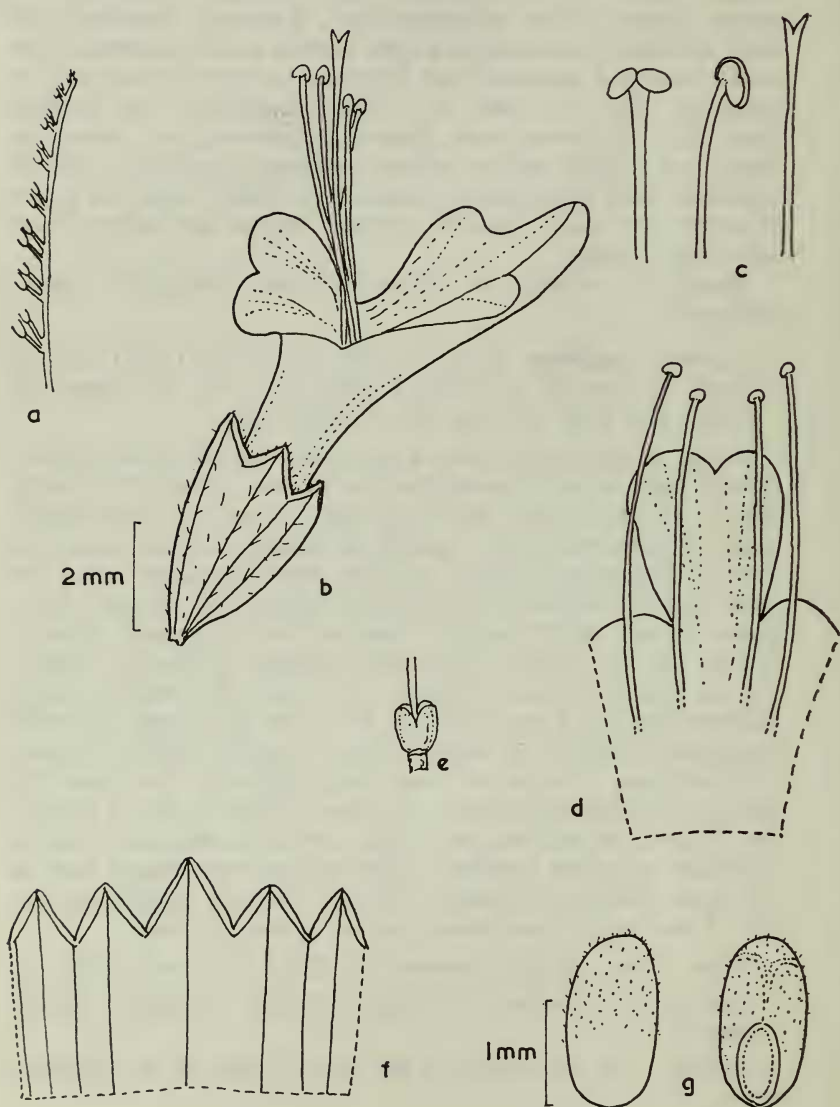


Fig. 3. *Acrymia ajugiflora* Prain.

a. diagram of a branch of cymose inflorescence; b. flower; c. Young stamen (in 2 views) and style; d. upper lip of corolla expanded; e. ovary; f. calyx expanded; g. nutlet, in 2 views. (Steenis 18509)

4. **AJUGA LINN.**

Ajuga Linn. Gen. Pl. ed. 5 (1754) 246; Sp. Pl. (1753) 561; Benth. & Hook. f. Gen. Pl. 2 (1876) 1222; Briq. in E. & P. Pfl. Fam. 4, 3a (1897) 209.

Annual or perennial herbs. Leaves opposite, petiolate or sessile. False whorls many-flowered (in Malesian species), axillary or in terminal leafy spike-like inflorescence. Calyx usually 10-nerved; teeth 5, subequal. Corolla exserted; tube often annulate within; limb 2-lipped, the upper lip usually very short, 2-fid, the lower lip long and spreading or slightly concave, 3-lobed, the midlobe the largest, often notched at the apex. Stamens 4, in two pairs, ascending, exserted; anthers 2-loculate, divaricate, often confluent at length. Disk symmetric or produced behind. Ovary shortly 4-lobed; style 2-fid at the end, the branches subequal. Nutlets elliptic or obovoid, reticulate-rugose; scar very large, lateral.

About 50 species, throughout the Old World. Only one species extends to Malesia.

1. **Ajuga bracteosa** Wall. Cat. (1830) no. 2032, *nom. nud.*; Benth. in Wall. Pl. As. Rar. 1 (1830) 59, Lab. Gen. & Sp. (1835) 696 in DC. Prodr. 12 (1848) 597; Hook. f. Fl. Brit. Ind. 4 (1885) 702; Merr. Enum. Philip. 3 (1923) 408; Kudo in Mem. Fac. Sc. & Ag. Taihok Un. II, 2 (1929) 287; Mukerj in Rec. Bot. Surv. India 14, 1 (1940) 224.

Ajuga remota Benth. in Wall. Pl. As. Rar. 1 (1830) 59.

Ajuga macrosperma (non Wall.) Miq. Fl. Ind. Bat. 2 (1859) 991.

Ajuga ternatensis Miq. in Herb. Utrecht.

Ajuga loheri Rolfe in Herb. Kew.

Ajuga macrosperma Wall. var. *cuneata* Back. in Herb. Leiden.

A low, diffuse, much branched herb, usually less than 20 cm high. Stems and branches from the rootstock, erect or ascending, generally hispid. Leaves oblanceolate, narrowly obovate or subspathulate, 4–8 cm long, 2–3 cm wide, obtuse or rounded, the base cuneate or gradually attenuate; the margins undulate, hirsute on both surfaces; upper leaves sessile, lower ones shortly petiolate. Flowers many in axillary false-whorls, sometimes crowded in terminal, spike-like inflorescence, with ovate or cuneate-obovate, entire or toothed prominent bracts. Calyx campanulate, often slightly oblique, 3–3.5 mm long, the teeth triangular. Corolla-tube straight, exserted, not inflated at the base; lower lip 2 mm long, 3-lobed, hirsute without. Stamens exserted, the locules confluent, often hairy. Nutlets obovoid, 1.5–2 mm long, 1 mm wide, shallowly rugose-reticulate, yellowish.

Type specimen: Napalia, 1821, *Wallich 2032* (K).

Distribution: Afghanistan, Himalayas, Malesia (Philippines, Celebes, Moluccas, and New Guinea) to China.

Ecology: Chiefly on banks and shaded ravines, low to medium altitudes. Wet places at low elevations, up to 1,500 m.

Vernacular name: *Tilad* (Celebes).

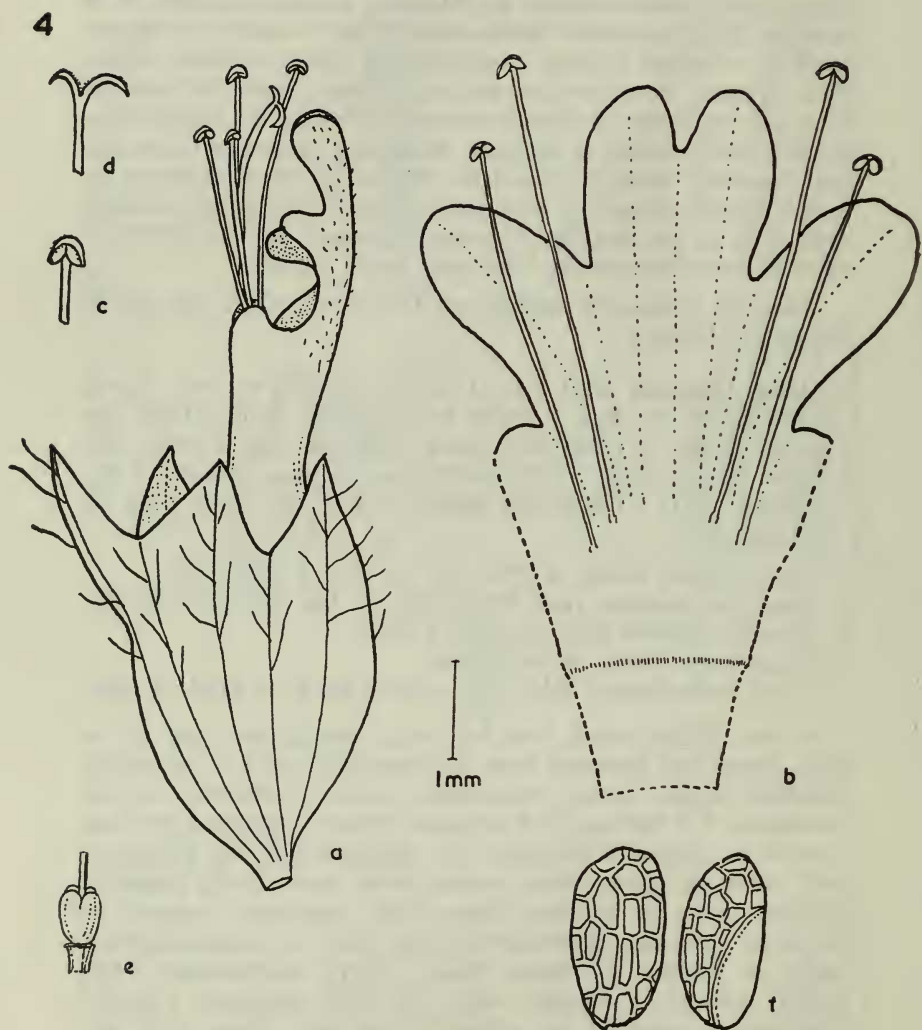


Fig. 4. *Ajuga bracteosa* Wall. ex Benth.

a. flower; b. corolla expanded, showing the stamens and annulus; c. anther; d. tip of style; e. ovary, f. nutlet, in 2 views. (Ramos & Edano 45071)

Specimens examined:

Philippines: Luzon, *Clemens* 570 (K), *Elmer* 8626 (K), *Loher* 4205, 4206 (K), *Merrill* 4422 (K), 7773 (BM), 10626 (BM, Sing. L), *Ramos & Edano* 37874, 45071 (L).

Celebes: *Forsten s.n.* (L), *Kaudern* 380 (L).

Moluccas: Talaud Isle. alt. 200 m. *Lam* 3160 (corolla white, young fruit green-yellow) (L), *Halmaheira*, *Pleyte* 171 (L), *Teysmann* 7845 (L); P. Ternate, *Teysmann* 5194 (U 76816A), *DeVriese & Teysmann s.n.* (L).

New Guinea: Seroei, *Aet & Idjan* 997 (L).

Specimens from Malesian region, in comparison with the type specimen, *Wallich* 2032, possess more elongate and less hairy leaves and much shorter corolla. In these respects, they match the type specimen of *Ajuga remota* Benth. (*Wallich* 2033, from Kamaon) quite well. The latter, however, was reduced as synonymous with *A. bracteosa* by Hooker f., Kudo, Mukerjee and others. Their basic floral structures are much the same.

5. *ANISOMELES* R. BR.

Anisomeles R. Br. Prodr. (1810) 503; Benth. in Benth. & Hook. f. Gen. Pl. 2 (1876) 1207; Briq. in E. & P. Pfl. Fam. 4, 3a (1897), 268.

Herbs, or sometimes shrubby. Stems and branches softly pubescent or woolly. Flowers in axillary whorls or loosely forming terminal spicate or paniculate inflorescence. Calyx ovoid or tubular, straight, 10-nerved, almost equally 5-toothed. Corolla-tube short, annulate within; upper lip short, entire and erect; lower lip 3-lobed, broad and patent, the mid-lobe retuse or notched. Stamens exserted, in 2 pairs; anthers connivent, those of the lower pair often longer, smaller and dimidiate, and of the upper pair shorter, larger and 2-loculate, the locules parallel. Disk equal. Style subequally 2-fid. Nutlets smooth, flattened, bluntly angular, and with rather prominent scar on the ventral surface.

Species 5 to 6, in tropical and subtropical Asia and N. E. Australia; 3 in Malesia.

Key to the species

- A. Stems and branches acutely 4-angled, softly pubescent or glabrescent, brownish; fruiting calyx teeth nearly as long as the tube.
 - B. Leaves hirsute or glabrescent, ovate, flowers usually numerous, in dense axillary false whorls, often forming approximately dense spicate inflorescence; seeds ovoid.
 - 1. *A. indica*
 - B. Leaves densely villose, oblong-elliptic or lanceolate; flowers fewer, in axillary false whorls, often distantly disposed; seeds ellipsoid.
 - 2. *A. salviaefolia*
 - A. Stems and branches obtusely 4-angled, densely woolly, grayish; fruiting calyx teeth much shorter than the tube.
 - 3. *A. malabarica*

W. Rothmaler (in Redde, Report. 53 (1944) 12) claimed that he had discovered Adanson's type specimen of *Epimeredi* (Fam. Pl. 2 (1763) 192) in the Paris Herbarium, and which he identified as *Anisomeles*. Therefore he reduced *Anisomeles* R. Br. as synonymous with *Epimeredi* Adans. and made a number of combined names. Yet from Adanson's original description, it is very difficult to conceive whether he referred to *Anisomeles* or other plants. Without further evidence, Robert Brown's generic name should be considered as valid.

1. ***Anisomeles indica*** (Linn.) O. Kuntze. Rev. Gen. Pl. (1891) 512; Merr. Enum. Philip. 3 (1925) 412; Mukerj. in Rec. Bot. Surv. Ind. 14, 1 (1940) 152; Back. & Bakh. f. Fl. Java 2 (1965) 624 (incl. 3 varieties).

Nepeta indica Linn. Sp. Pl. (1753) 571.

Anisomeles ovata R. Br. in Ait. Hort. Kew ed. 2, 2 (1811) 364; Benth Lab. Gen. & Sp. (1835) 702 (incl. b. *mollissima*), in DC. Prodr. 12 (1848) 455; Miq. Fl. Ind. Bat. 2 (1858) 975 (incl. r. *serratifolia* Miq.); Hook. f. Fl. Brit. Ind. 4 (1885) 672; Prain in J. As. Soc. Beng. 74 (1907) 715; Ridl. Fl. Mal. Pen. 2 (1923) 649.

Nepeta malabarica (non Linn.) Blume, Bijdr. (1826) 823.

Phlomis indica (non Forsk) Blanco, Fl. Filip. (1837) 474.

Anisomeles malabarica (non R. Br.) Miq. Fl. Ind. Bat. 2 (1859) 976.

Anisomeles albiflora (Hassk.) Miq. Fl. Ind. Bat. 2 (1859) 976.

A herbaceous or shrubby plant, 0.5–1.5 m high. Stems and branches acutely 4-angled, sparingly hairy to densely pubescent. Leaves thin- to thick-membranaceous, ovate to broadly ovate, 4.5–6 cm long, 3–3.5 cm wide, acute, the base rounded or truncate, subcordate, less often shortly cuneate, entire; margins elsewhere crenate-serrate, often irregular, sometimes almost pinnatifid, hirsute or woolly on both surfaces; petiole 1.5–4 cm long, tomentose. Flowers in dense false whorls, distant below, approximate above in a dense spicate inflorescence; bracts linear, 3–4 mm long, pilose. Calyx campanulate, 5–7 mm (in fruit 9–10 mm) long, shortly pedicellate, hirsute and pilose; teeth lanceolate, acute, almost as long as the tube, ciliate. Corolla tubular, 7–8 mm long. Filaments hirsute. Nutlets broadly ovoid, 1.8–2 mm long, 1.4–1.5 mm broad, subcompressed.

Distribution: India to S. China, Japan and to Malesia.

Vern. names: Batoe-Babra, Sibö (Sumatra); Tahate dawang, Lalah (Lesser Sunda Islands); Kabling-lalake, Kadling-parang, Lilitan, Litalit, Sauang-sauang, Subusuba, Talingharap (Philippines).

Ecology: In open and waste places near settled areas, mostly at low altitudes.

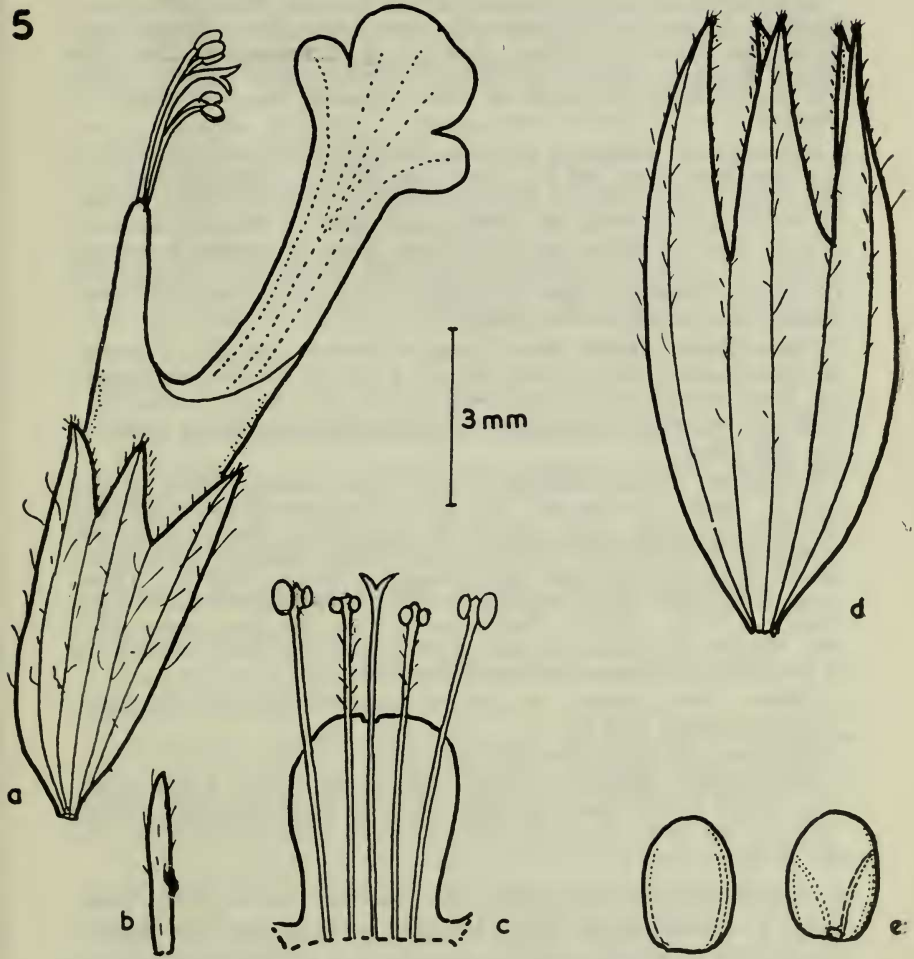


Fig. 5. *Anisomeles indica* O. Kuntze.

a. flower; b. bract; c. portion of upper corolla-lip with stamens and style; d. fruiting calyx; e. nutlet in 2 views (flower, *Sijde* 27, fruit, *Lörzing* 6307)

Specimens examined:

Sumatra: Telug Kabung, *Borssum Waalkes* 1658 (L); West Coast, alt. 950 m., *Bünnemeyer* 8191 (K); Sumatra, *Cuming* 2438 (K); Cajolanden, *Jochems* 115 (L); Medan, *Lörzing* 13009 (L) (shrubby 1–1.5 m., fls. white); Karohoeheben, alt. 1,250 m., *Lörzing* 13571 (L); Lake Toba, alt. 1,000 m., *Lörzing* 14859 (L) (fls. purplish); Lake Toba, *Ridley s.n.* (K); Korinchi, Sandagang Agong, *Robinson & Kloss s.n.* 1914 (K); Kebanagoeng, *Voogd* 1214 (L); Batoe Bara, *Yates* 2237 (Sing.).

Malay Peninsula: Selangor, Kuala Lumpur, *Burkill & Haniff* 16386 (Sing.); Malacca, *Cuming* 2438 (K); Penang, *Curtis* 1411 (Sing.); Perak, Ipoh, *Molesworth-Allen* 4117 (Sing.); Selangor, Port Swettenham, *Nur* 3006 (Sing.); Singapore, *Ridley* 2692 (Sing.); Selangor, Kuala Lumpur, *Ridley s.n.* Dec. 1920 (K) (fls. white, lip mauve); Penang, *Ward s.n.* June 1941 (Sing.).

Java: Batavia, *Bakhuizen v/d Brink* 1939 (K); Buitenzorg, *Danser* 6295 (L); Soerabaya, *Hoed* 509 (L); Java, *Hoed* 3067 (L); Java, *Horsfield s.n.* (K); Java, *Kooper* 7284 (L); Madioen, *Koorders* 29137 (K); West Bantam, alt. 0 m., *Kregten* 88 (L) (fls. purple); Java, *Lobb. s.n.* (K); Mt. Batu, alt. 260 m., *Nedi & Idjan* 366 (L) (40 cm. high, fls. white); Buitenzorg, *Ooststroom* 12649 (L); Buitenzorg, *Raap* 422 (L); Bogor, *Teysmann* 456 (L); Java, *Zollinger* 183 (BM, K) (type of *Anisomeles ovata* β . *mollissima* Benth.); Java, *Zollinger* 3039 (BM).

Lesser Sunda Islands: Babar, *Borssum Waalkes* 3010 (L); Tanimber, *Borssum Waalkes* 3163 (L); Alor, *Jaag* 412 & 627 (L); Soemba, Matahapore, alt. 50 m., *Monod de Freideville* 1943 (L) (fls. pink, strongly aromatic).

Borneo: Sarawak, Baram, *Hose* 283 (BM); Sarawak, Native Collector, *s.n.* 1888 (Sing.).

Philippines: Luzon, Batangas, *Aranez* 2 (L); Luzon, *Button* 51 (L); Luzon, Lagona, *Cuming* 643 (K, L); Philippines, *Cuming* 1878 (K); Mindanao, Agusan, *Elmer* 13443 (K, L); Luzon, *Elmer* 16482 (K); Mindanao, Pasanan, *Frake* 36263 (L) (fls. violet); Mindanao, Zamboanga, *Hallier* 4619 (L); Sulu Isls., Siasi, *Kondo & Edano* 38960 (L); Luzon, *Loher* 4227 & 4228 (K); Luzon, *Mundo* 34 (L); Luzon, Isabela, San Mariano, *Ramos & Edano* 16710 (L, Sing.); Luzon, Rizal, Mt. Iriq, *Ramos* 41935 (K); Mindoro, Pinagbayanan, *Sulit* 22477 (L) (fls. pale blue); Luzon, *Vidal y Soler* 506 (K); Luzon, Bataan, *Williams* 100 (K).

Celebes: Soela Sanana, alt. 200 m., *Bloembergen* 4429 (L); Malili, Tawibaroë, *Eyma* 4201 (L).

Moluccas: Moluccas, *Buwalda* 4043 (L).

New Guinea: Hollandia, *McKee* 1790 (L) (fls. pink); Kebar Valley, *Royen* 5023 (K, L, Sing.) (fls. blue, white at base); Merauke, *Versteeg* 1858 (L) (fls. upper lip green, lower lip lilac); Merauke, *Zijde* 4031 (L) (fls. lilac).

A widely distributed species, the tomentum varying from pubescent to woolly. Prain (1907) intended to recognize two varieties ('glabrata' and 'mollissima'). A large number of intermediate forms renders the infraspecific delimitation rather impractical.

The colour of flowers of this species, according to the field notes made by various collectors, vary from white to violet, recorded possibly in different stages at anthesis.

Anisomeles malabarica R. Br., a species of S. India and Ceylon, was collected twice from Penang, Malaya. A specimen deposited in the Leiden herbarium named as "*Nepeta malabarica*" (collected and identified probably by Blume, from Batavia, Java, bearing the number of *Herb. Lugd. Bat. no.* 952, 55–502), should however, be correctly referred to *Anisomeles indica* O. Kuntz.

2. **Anisomeles salviaefolia** R. Br. Prodr. (1810) 503; Benth. Lab. Gen. & Sp. (1835) 702, in DC. Prodr. 12 (1848) 455; Miq. Fl. Ind. Bat. 2 (1859) 976; Mansf. in Bot. Jahrb. 62 (1929) 376.

Anisomeles candicans (non Benth.) Miq. Fl. Ind. Bat. 2 (1859) 976.

A bushy plant, 0.5–1 m. or more high. Stems and branches acutely 4-angled, densely villose. Leaves membranaceous, sparingly hairy above, densely tomentose beneath, elliptic to narrowly ovate, 3–5 cm long, 1.5–2.5 cm wide, acute, the base broadly acute, entire; margins elsewhere crenate-serrate, petioles 0.5–1.5 cm long, tomentose. Flowers many (usually less than 15), in axillary false whorls, often distantly disposed; bracts linear lanceolate, 2–3 mm long. Calyx nearly cylindric, narrowed on both ends, 5–8 mm (in fruit 8–9 mm) long, hirsute and pilose externally, the teeth broadly lanceolate, acuminate, 2–3 mm long, hairy and ciliate. Corolla 6–7 mm long, puberulent. Filaments puberulent or pubescent. Nutlets ellipsoid, 2 mm long, 1.2 mm broad, reddish brown, smooth.

Type specimen: In Nova Hollandia tropica, *R. Brown s.n.* (BM).

Distribution: N. E. Australia and Malesia (Lesser Sunda Isls. and New Guinea).

Ecology: Commonly found in open places at low altitudes.

Vern. names: Kaleb-Kaleb, Keranke (New Guinea).

Specimens examined:

Lesser Sunda Islands: Timor, *R. Brown s.n.* (in 1803) (BM), *Meyer s.n.* (in 1884) (K), *Smith & Wiles 1792* (BM).

New Guinea: Waraka, Papua, alt. 200 m. *Arttwell 154* (K); N. Coast, *Atasrip s.n.* (in 1903) (L); Baroka, Nakeo, C. Division, Papua, *Brass 3715* (BM); New Guinea, *Koch s.n.* (in 1904–5) (L); Hollandia, *McKee 1790*; Tamurik, S. N. Guinea, *Wentholt 228* (L).

In the Leiden herbarium, there are two old collections of this plant from Timor, without collector's name or other data, and numbered as Lugd. Bat. Herb. 904, 350–355, and 904, 350–356. Both are named as *Anisomeles candicans* Benth., a species confined to upper Burma.

The description given above is based on the New Guinea and Timor specimens which are somewhat intermediate between Australian *Anisomeles salviaefolia* and Malesian *Anisomeles indica*.

3. **Anisomeles malabarica** (L) R. Br. ex Sims in Bot. Mag. 46 (1819) *t.* 2071; Benth. in Wall. Pl. As. Rar. 1 (1830) 59, in DC. Prodr. 12 (1848) 456; Hook. f. Fl. Brit. Ind. 4 (1885) 673; Prain in J. As. Soc. Beng. 74 (1907) 716; Ridl. Fl. Mal. Pen. 2 (1923) 649; Mukerj. in Rec. Bot. Surv. Ind. 14, 1 (1940) 153.

Nepeta malabarica Linn. Mant. Pl. 2 (1771) 566.

Anisomeles intermedia Wight in Benth. Lab. Gen. & Sp. (1835) 703; Benth. in DC. Prodr. 12 (1848) 456.

Erect, shrubby, 0.5–1.5 m high; stems and branches obtusely 4-angled, densely tomentose or thickly woolly, silvery white. Leaves thick-chartaceous, narrowly oblong or oblong-lanceolate, 5–8 cm long, 2–3 cm wide, acute, the base rounded or shortly cuneate, entire; margin elsewhere crenate-serrate, silvery woolly-tomentose beneath; petiole 0.5–2.5 cm long, stout, softly woolly. Flowers in dense false whorls, distant below, approximate above, forming an interrupted spicate inflorescence, 8–10 cm long; bracts lanceolate, 1–1.5 cm long, acute, woolly. Calyx campanulate, 6 mm (in fruit 1 cm) long, densely villose, the margins ciliate. Corolla 13–14 mm long, puberulent. Filaments pubescent. Nutlets ellipsoid, 2 mm long, 1 mm broad, compressed, inner surface faintly angled, outer rounded, shining, brown.

Distribution: S. India to Ceylon, Mauritius and Malesia (Penang).

Ecology: a weed, on waste ground.

Specimens examined:

Malay Peninsula: Penang, *Wallich 2037* (K); Ayer Itam, Penang, *Curtis 3741* (K, Sing.) (Herb, 2–3 ft., fls. pink).

Prain (1907) and Ridley (1923) both pointed out that this plant in Malesia being confined to Penang, is probably an introduced species.

6. BASILICUM MOENCH

Basilicum Moench, Suppl. Meth. Pl. (1802) 143; O. Ktze. Rev. Gen. Pl. 2 (1891) 512; Morton in Hutch. & Dalz. Fl. W. Trop. Afr. 2 (1963) 454.

Moschosma Reichb. Consp. (1828) 171, *in adnot.*; Benth. Lab. Gen. & Sp. (1832) 24, in DC Prodr. 12 (1848) 48; Benth. in Benth. & Hook. f. Gen. Pl. 2 (1876) 1173; Briq. in E. & P. Pfl. Fam. 4, 3a (1897) 368.

Annual or perennial herbs, erect, branched. Leaves opposite, petiolate. False whorls 6–10-flowered, secund, in axillary and terminal raceme-like inflorescences. Flowers very small; bract minute. Calyx ovoid or campanulate, 5-toothed, the uppermost tooth often very broad and forming the upper lip, the 2 lateral teeth often associated with the 2 lower teeth and forming the lower lip; throat of calyx naked. Corolla tubular-campanulate, the tube short, the limb 2-lipped; upper lip clearly 3-lobed (in Malesian species), the mid-lobe entire or shallowly notched; lower lip entire, auriculate at the base. Stamens 4, declinate; filaments not appendiculate; anthers 2-loculate. Style clavate, shortly 2-fid at the tip. Nutlets ovoid, compressed, smooth.

Species 6–7, widely distributed in tropical Asia and Africa; 1 extended to Malesia.

Basilicum Moench (1802), as O. Kuntze pointed out, is homonymous with *Basilicum* Rumphius. However, the former was based on an entirely different plant, and accompanied by an accurate description. Furthermore, it did not refer to Rumphius' name.

1. ***Basilicum polystachyon*** (L.) Moench. Suppl. Meth. Pl. (1802) 143; Morton in Hutch. & Dalz. Fl. W. Trop. Afr. 2 (1963) 454. *Ocimum polystachyum* Linn. Mant. 2 (1771) 567.

Ocimum tenuiflorum (non Linn.) Burm. f. Fl. Ind. (1768) 129.

Moschosma polystachyum (Linn.) Benth. in Wall. Pl. As. Rar. 2 (1831) 13, in DC. Prodr. 12 (1848) 48; Miq. Fl. Ind. Bat. 2 (1858) 942; Hook. f. Fl. Brit. Ind. 4 (1885) 612; Merr. Enum. Philip. 3 (1923) 421; Ridl. Fl. Mal. Pen. 2 (1923) 644; Mansf. in Bot. Jahrb. 62 (1929) 380; Back. & Bakh. f. Fl. Java 2 (1965) 638, (as *polystachyon*).

Moschosma tenuiflora (Burm. f.) Heynh. Nomen. 1 (1840) 532; Merr. Fl. Man. (1912) 408.

An erect herb, 40–100 cm high. Stems much branched, nearly glabrous, prominently 4-angled. Leaves thin membranaceous, ovate to oblong-ovate, 2–5 cm long, 1–3.5 cm broad, acuminate or caudate, the base acute or attenuate, the margins irregularly serrate, glabrous on both surfaces; petioles slender, 1–4 cm long. Raceme-like inflorescence 3–6 cm (in fruit over 10 cm) long; false-whorls 6–10-flowered; bracts minute, lanceolate, aristate, 1–2 mm long; pedicels 1–2 mm long, persistent. Calyx ovoid or campanulate, pubescent, 1.5–2 mm (in fruit 3–3.5 mm, slightly inflated near the base) long; upper lip broad, entire, reflexed; lower lip 4-toothed, the 2 lateral teeth ovate, and the 2 lower teeth cuspidate. Corolla 2–2.5 mm long. Stamens 4, in 2 pairs, included. Nutlets minute, broadly ellipsoid, compressed, smooth.

Distribution: Tropical Africa, Tropical Asia to Australia.

Ecology: A weed, in open waste land, often scattered in the settled areas, or in rice-fields.

Vern. names: Soelaseh doelang, Main-main, Tapoea djatten (Sumatra), Bauin, Lodokon, Pansi-pansi (Philippines, fide Merrill), Ariordan (New Guinea).

Specimens examined:

Sumatra: Asahan, Bartlett & Rue 501 (L); Karo Highlands, Berastagi, Hamel 413 (L); Karo Highlands, N. Berastagi, Hamel & Rahmat Si Boeea 463 (L); Tapianoeli, Maranti, Rahmat Si Boeea 6114 (L); Tapianoeli, Loemban Lobo, Toba, Rahmat Si Boeea 9809 (L); Loemban, Toba, Rahmat Si Boeea 10539 (L); Tapianoeli, Porsea, Toba, Rahmat Si Boeea 10831 (L); Loemban, Toba, Rahmat Si Boeea 10918 (L); Tapianoeli, Dolok Si Manoeck-manoeck, Rahmat Si Boeea 11224 (L); Tapanoeli, Surbeck 222 (L); Sumatra, Teruya 2955 (Sing.).

Malay Peninsula: Penang, Curtis 1430 (Sing.); Perlis, Ridley 14928 (K, Sing.); Kedah, Ridley 14930 (K, Sing.); Penang, Sinclair 39372 (K, L, Sing.).

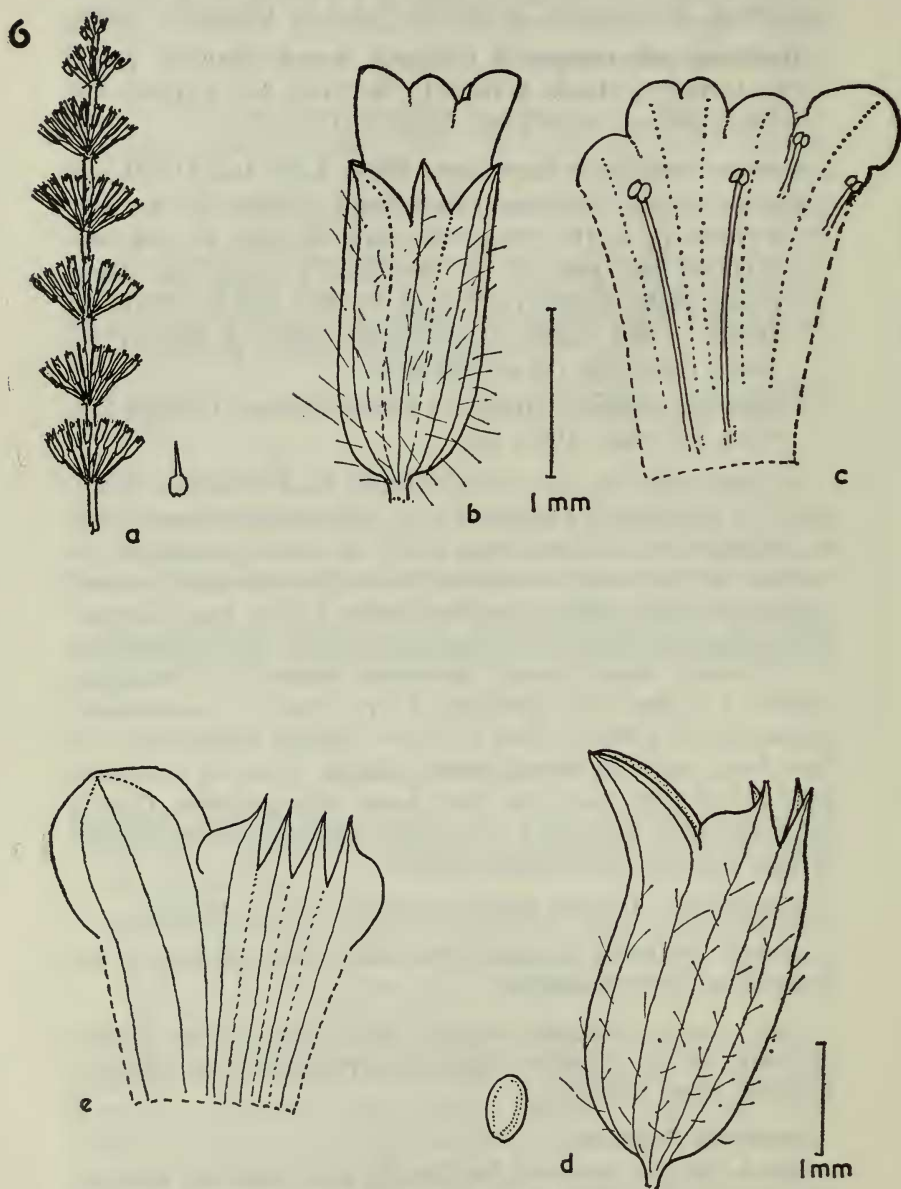


Fig. 6. *Basicicum polystachyon* Moench.

a. diagram of the spurious spicate inflorescence and a bract (enlarged); b. flower; c. corolla expanded, showing the stamens; d. fruiting calyx and nutlet; e. fruiting calyx expanded. (Sinclair 39372)

Java: Bantam, *Amdjah* 5 (L); Weltevreden, *Backer s.n.* 1902 (L); Randoeblatong, Rembang, alt. 150 m., *Backer* 6632 (L); T. Lorok, *Backer* 7644 (L); Pasoeroean, alt. 3 m., *Backer* 7644 (L); Poeger, alt. 15 m., *Backer* 18087 (L); Madjenang, alt. 30 m., *Backer* 18597 (L); Pasoeroean, alt. 4 m., *Backer* 36307 & 36568 (L); Buitenzorg, alt. 250 m., *Bakhuizen v/d Brink Jr.* 1940 (K, L); Java, *Blume s.n.* (L) (several collections); Java, *Blume* 1195 (L); Soerabaja, alt. 15 m., *Dorgelo* 515 (L); Bogor, cult. in Hort., *Hallier* 295 (L); Java, *Horsfield s.n.* (K); Semarang, alt. 15–20 m., *Houwing s.n.* 1924 (L); Semarang, alt. 15–20 m., *Houwing* 394 & 531 (L); Semarang, alt. 10–15 m., *Houwing* 845 (L); Semarang, alt. 15–20 m., *Houwing* 906 (L); Java, *Junghuhn* 22 (L) (several collections); Pangalengan, alt. 1,400 m., *Karsten* 36 (L); Banjoemas, *Kievits & Kooper* 7 (L); Banjoemas, alt. 20 m., *Kievits* 282 (L); Banjoemas, *Kievits* 2591 (L); Besoeki, Poeger Watangan, alt. 10 m. *Koorders s.n.* Oct, 1895 (L); Besoeki, *Koorders* 21550 (K); Bagelen, Karanganjer, *Koorders* 26233 β (L); Batavia, *Reinwardt* 1195 (L); Sourabaya, *Teruya* 1656 (Sing.); Java, *Wade s.n.* (L); Semarang, *Waitz s.n.* (L).

Lesser Sunda Islands: Lombok, alt. 50 m., *Elbert* 2387 (L); Timor, near Lore, alt. 1–5 m., *Steenis* 18194 (L) (fls. pale lilac); Timor, *Teysmann* 732 (K); Timor, *Teysmann* 10732 & 19742 (L); Bali, Tjoelik, alt. 0 m., *Voogd* 2052 (L); Lombok, *Wallace s.n.* 1856 (K); Timor, *Zippelius* 46 (L); Timor, *Zippelius s.n.* (L) (several collections).

Borneo: Poeloe Lampe, *Korthals* 23 (L).

Philippines: Luzon, *Cuming* 478 (K); Luzon, *Loher* 4214 (K); Luzon, Manila, *Merrill sp. Blanco* 423 (K, L); Luzon, Apalit, *Ramos* 41645 (K, Sing.); Catanduanes, *Ramos & Edano* 75303 (Sing.).

Celebes: Celebes, Belang, *Forsten* 325 & 328 (L); Celebes, *Teysmann* 12163 (L); Tempe, *Weber s.n.* (L).

Moluccas: Halmaheira, *Anang* 484 (L); Moluccas, *Forsten s.n.* (L) (several collections).

New Guinea: New Britain, Möwehafen, *Blackwood* 329 (K) (fls. purplish) ("Asiordan"); Papua, Gaima, lower Fly River, *Brass* 8321 (L) (fls. pink); Kaiserin Augusta River, near Papua, *Gjellerup* 356 (L); Hollandia, alt. 5 m., *Gjellerup* 998 (L); Merauke, *Koch s.n.* 1904–05 (L); E. Merauke, *Versteeg* 1938 (L).

7. CALAMINTHA MILL.

Calamintha [Tourn.] Mill. Gard. Dict. ed. 4, 1 (1754); Lamk. Fl. Fr. 2 (1778) 393; Moench. Meth. Pl. (1794) 408; Benth. in DC. Prodr. 12 (1848) 226, p.p., in Benth. & Hook. f. Gen. Pl. 2 (1876) 1190.

Melissa Linn. *sensu* Benth. sect. *Calamintha* (Moench.) Benth. Lab. Gen. & Sp. (1834) 384.

Satureia Linn. *sensu* Briq. sect. *Calamintha* (Moench.) Briq. in E. & P. Pfl. Fam. 4, 3a (1897) 301.

Herbs often slender and prostrate (in Malesian species). Flowers small or medium-sized, in dense axillary false whorls and often forming loose spicate or racemose inflorescence. Calyx campanulate, always 13-nerved, 2-lipped; upper lip 3-toothed, the teeth broad and highly connate; lower lip 2-toothed, the teeth subulate;

throat naked or villous. Corolla-tube straight, the limb 2-lipped; upper lip erect, flat; lower lip spreading, 3-lobed. Stamens 4, in 2 pairs, ascending under the upper lip; upper pair always small and imperfect (in Malesian species); anthers 2-loculate, the locules parallel or divaricate. Disk uniform, entire. Style lobes equal or the upper lobe smaller. Nutlets minute, subglobose, smooth.

Species about 40 in North temperate regions, few extended to the tropical mountains; 2 species and 1 variety in Malesia.

Controversial opinions have been expressed as to whether *Calamintha* should be reduced to a section of *Satureia* as suggested by Briquet. For two opposing views, see Brenan (in Mem. N. Y. Bot. Gard. 9 (1954) 47) and De Wolf (in Bailey 2 (1954) 149). A full discussion on the nomenclature problems of the generic name *Calamintha* can also be found in another paper by De Wolf (in Rhodora 57 (1955) 74). In this treatment, *Calamintha* is considered as a separate genus.

Key to the species

- A. Calyx sparsely hirsute; upper calyx-teeth as long as or shorter than the lower ones; fruiting calyx 3.5–4 mm long; corolla-tube barely exserted. 1. *C. gracilis*
- A. Calyx densely pilose; upper calyx-teeth slightly longer than the lower ones.
 - B. Fruiting calyx 4.5–5 (–8) mm long; corolla-tube shortly exserted. 2. *C. umbrosa* var. *umbrosa*
 - B. Fruiting calyx 10–12 mm long; corolla-tube long-exserted. 2a. *C. umbrosa* var. *javanica*.

1. ***Calamintha gracilis*** Benth. in DC. Prodr. 12 (1848) 232; Miq. Fl. Ind. Bot. 2 (1859) 968; Prain in J. As. Soc. Bengal 74, 2 (1907) 711; Ridl. Fl. Mal. Pen. 2 (1923) 648.

Cunila moluccana Zipp. in Herb. Lugd. Bat.

Calamintha molucana Miq. Fl. Ind. Bat. 2 (1859) 968. *syn. nov.*

Satureia gracilis (Benth.) Nakai in J. Coll. Sc. Un. Tokyo 31 (1911) 149; Back. & Bakh. f. Fl. Java 2 (1965) 630.

A slender, prostrate herb. Stems puberulous, rooting on the lower nodes. Leaves membranaceous, broadly ovate or subrounded, 1–2 cm long, 0.8–1.5 cm wide, acute, the base rounded or broadly cuneate, entire, margins elsewhere crenate-serrate, glabrous on both sides except on the nerves; petioles 0.5–1 cm long, puberulous. Flowers in lax many-flowered false whorls in axils of upper leaves, sometimes aggregated in racemose or subcapitate terminal inflorescence; bracts subulate, puberulous; pedicels slender, 1–3 mm long. Calyx tubular-campanulate, 2–3 mm (in fruit 4–4.5 mm) long, sparsely hirsute; tube slightly inflated below; upper teeth recurved, highly connate, slightly shorter than the lower ones; lower teeth subulate, ciliate, slightly incurved. Corolla straight, 3–4 mm long, barely exserted. Anther-locules parallel, connivent. Nutlets rounded, compressed, 0.5–0.6 mm across, pale brown, finely reticulate.

Distribution: India, Burma, Thailand to S. China, Formosa, S. Japan and Malesia.

Ecology: In wet, open places or in grassland, at low and medium altitudes (600–2,400 m).

Specimens examined:

Malaya: Perak, Taiping, *Burkill & Haniff 12812* (Sing.); Pahang, Fraser's Hill, alt. 1,300 m., *Purseglove 4118* (L, Sing.); Perak, Taiping, *Ridley 11912* (K, Sing.); Perak, Maxwell's Hill, *Spare 1486* (Sing.); Maxwell's Hill, alt. 1,200–1,300 m., *Sinclair & Kiah SF 38620* (K, L, Sing.) (creeping; fls. pink).

Java: Wanajasa, alt. 700 m., *Backer 13995* (L); Poerwakarta, alt. 630 m., *Bakhuizen v/d Brink 4618* (L) & *4839* (K, L); Tjilame, alt. 700 m., *Doctors V. Leeuwen 2760* (L).

Lesser Sunda Islands: Timor, *Zippelius s.n.* (L).

Celebes: Masamba, alt. 2,000–2,400 m., *Eyma 1510* (L) (fls. lilac).

Moluccas: Timor, *Zippelius s.n.* (*Herb. Lugd. Bat. 904, 351–38*) (type of *Calamintha molucana* Miq. L.) Molucca, *Zippelius s.n.* (L) (several collections).

Type specimen of Miquel's *Calamintha molucana*, (which apparently is based on Zipellius' unpublished binomial "*Cunila molucana*") has been studied. It proved to be identical with *Calamintha gracilis*.

2. ***Calamintha umbrosa*** (Bieb.) Benth. in DC. Prodr. 12 (1848) 233; Miq. Fl. Ind. Bat. 2 (1859) 968; Hook. f. Fl. Brit. Ind. 4 (1885) 450; Merr. & Rolfe in Philip. J. Sc. 3 (1908) Bot. 123; Merr. Enum. Philip. 3 (1923) 410. var. ***umbrosa***.

Melissa umbrosa Bieb. Fl. Taur.-Cauc. 2 (1808) 63.

Ziziphora javanica Bl. Bijdr. (1826) 822, *syn. nov.*

Satureia umbrosa (Beib.) Scheele in Flora, 26 (1843) 577; Briq. in E. & P. Pfl. Fam. 4, 3a (1897) 302.

Stachys rubispala Elm. Leaf. Philip. Bot. 1 (1908) 338.

A slender herb, profused branched, often prostrate. Stems 30–60 cm high, pubescent, often rooting on the lower nodes. Leaves membranaceous, puberulous, ovate to broadly ovate, 1–1.5 (–2) cm long, 0.8–1.2 cm wide, acute, the base rounded or cuneate, entire; margins elsewhere serrate; petioles 0.3–1 cm long, pubescent. Flowers usually in dense whorls, subcapitate, terminal and in axils of upper leaves; bracts subulate, hirsute, 3–4 mm long, often 2–4 in groups. Calyx 4–4.5 mm (in fruit 4.5–6 mm) long, pubescent with spreading long hairs; tube slightly inflated below; upper teeth spreading, only slightly recurved; lower teeth subulate, pilose on the margins; pedicels 2–3 mm long, pubescent. Corolla 5–6 mm long, 2-lipped, straight. Stamens 4, only 2 larger ones functional. Nutlets subrounded, 0.7–0.8 mm across, compressed, smooth.

7

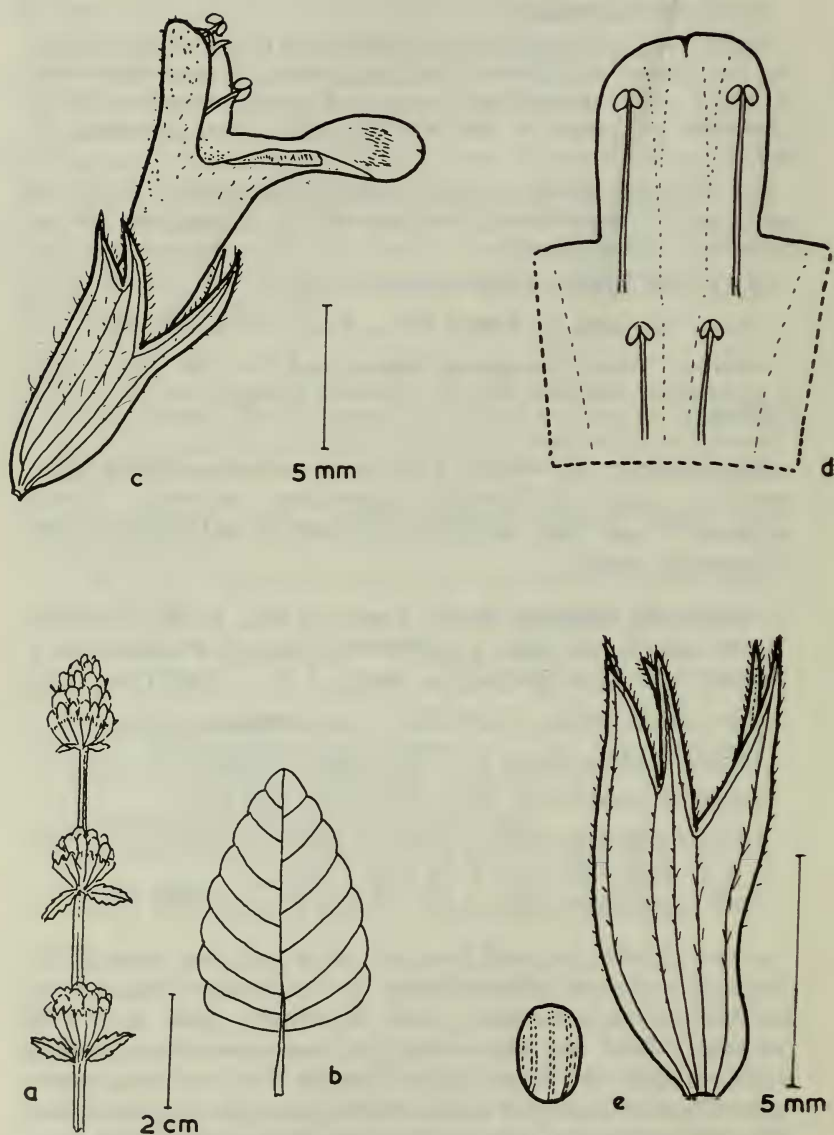


Fig. 7. *Calamintha umbrosa* Benth. var. *Javanica*.

a. diagram of portion of the inflorescence; b. leaf; c. flower; d. upper corolla-lip expanded, showing the stamens; e. fruiting calyx and nutlet (flower, Coert 1511, fruit Backer 37146).

Distribution: From Caucasus, Afghanistan, India to S. China and Japan and Malesia.

Ecology: Often in shaded ravines and on open slopes, altitudes 1,200–3,200 m.

Specimens examined:

Sumatra: G. Koerintji, alt. 1,700 m., *Bünnemeijer 9111* (K, L, Sing.).

Java: Tjeremai, *Blume s.n.* (L) (Type of *Ziziphora javanica* Bl.); Lawoe, alt. 3,100 m., *Brinkman 755* (L, Sing.); Besoeki, alt. 1,500 m., *Buwalda 7360* (L); E. Java, *Coert 1193* (L); Lawoe, alt. 2,900–3,200 m., *Elbert 147* (L); Preanger, *Forbes 678* (K) & *749* (BM, Sing.); Preanger, alt. 1,400 m., *Hochreutiner 1368* (L); Java, *Horsfield s.n.* (K); Java, *Junghuhn 36* (L), *47* (K, L) & *57* (K); Dieng, alt. 2,000 m., *Karsten 100* (L); Ngadisari, alt. 2,300 m., *Koorders 39702* (L); Besoeki, alt. 2,000 m., *Koorders 43200* & *43202* (L); Pasoeroean, alt. 2,500 m., *Koorders 43825* (L); Tosari, *Ridley s.n.* Jan. 1915 (K); Priangan, alt. 2,041 m., *Steenis 4268* (L, Sing.); Besoeki, alt. 1,900–3,000 m., *Steenis 10914* (L).

Lesser Sunda Islands: Lombok, *Elbert 1225* (L).

Philippines: Luzon, Benguet, Baguio, *Elmer 8408* (L) (Co-type of *Stachys rubispala* Elm.); Benguet, *Loher 4184* & *4185* (K); Luzon, Benguet, alt. 2,600 m., *Mearns 4358* (L); Luzon, Benguet, alt. 1,500 m., *Mendoza 40933* (L); Luzon, Benguet, Mt. Santo Tomas, *Merrill 11709* (K, L, Sing.); Luzon, Bontoc, Mt. Pukis, *Ramos & Edano 37712* (L) & *37798* (Sing.); Luzon, Lepanto, Mt. Data, *Ramos & Edano 40248* (K, Sing.); Luzon, Benguet, Mt. Pulog, *Ramos & Edano 44892* (L); Luzon, Bontoc, alt. 1,100 m., *Santos 5475* & *5760* (L) (fls. purple); Luzon, Benguet, Pauai, *Santos 31682* (K, L, Sing.); Benguet, *Sinclair & Edano 9696* (Sing.); Luzon, Baguio-Bontoc, alt. 1,800 m., *Steenis 17938* (L); Mt. Pauai, *Suli 7449* (L).

Lectotype of *Ziziphora javanica* Bl. in the Leiden herbarium (from Tjeremai, Java, collected by Blume) has been examined. It is indistinguishable from *Calamintha umbrosa* Benth. var. *umbrosa*.

2a. *Calamintha umbrosa* (Bieb.) Benth. var. *javanica* (Benth.) *stat. nov.*

Calamintha repens Benth. var. *javanica* Benth. in DC. Prodr. (1848) 233.

Satureia umbrosa (Bieb.) Scheele var. *javanica* (Benth.) Briq. in E. & P. Pfl. Fam. 4, 3a (1897) 302.

Satureia umbrosa (Bieb.) Scheele var. *repens* (D. Don) Briq. l.c. 302; Back. & Bakh. f. Fl. Java 2 (1965) 630.

Scutellaria repens D. Don, Prod. Fl. Nepal. (1825) 110.

This variety differs from the species chiefly in the larger flowers with much longer calyx (in flower 8–9 mm long, in fruit 9–10 mm long) and long-exserted corolla (9–12 mm long), and in the larger nutlets (1–1.2 mm across).

Distribution: Malesia (Java).

Ecology: On open slopes at higher altitudes (2,000m–3,000m).

Specimens examined:

Java: G. Tjeremai, alt. 2,700–3,000 m., *Backer 5083* (K); G. Tengger, alt. 2,000 m., *Backer 37146* (L); G. Djembangan, alt. 2,000–3,000 m., *Coert 1511* (L); Java, *Junghuhn 133* (K, L); G. Ardjoeno, *Voogd 779* (L); G. Tengger, alt. 2,500–2,600 m., *Zollinger 1794* (L).

8. **CERANTANTHUS** F. MUELL. ex G. TAYLOR

Ceratanthus F. Muell. *Fragm. Phytogr. Austral.* 5 (1865) 52 in obs. *nom. prov.*; G. Taylor in *J. Bot.* 74 (1936) 35.

Plectranthus sect. *Cornigera* F. Muell. *l.c.* 5 (1865) 51.

Hemsleia (non *Hemsleya* Cogn.) Kudo in *Mem. Fac. Sc. & Agr. Taihoku Un.* 2, 2 (1929) 142.

Herbs. Leaves opposite (or subverticillate at the base), petiolate. Flowers usually small, in few-flowered false whorls, forming a terminal raceme-like inflorescence. Calyx turbinate (more or less saccate in fruit), 5-toothed, 2-lipped; upper lip 3-lobed; lower lip obtuse, strongly incurved and gibbous in fruit. Corolla-tube exserted, spurred at the base; limb 2-lipped; upper lip 3-4-lobed, recurved; lower lip entire, concave. Stamens 4, in 2 pairs; filaments free, inserted at two different levels. Style briefly 2-fid. Nutlets orbicular, often finely pitted.

Species about 10, mostly in Thailand, Indo-China and S. W. China; only 1 species occurs in New Guinea and Australia (N. E. Queensland). The peculiar disjunctive distribution pattern of this genus has been cited by Prof. Lam (in *Proc. 7th Pac. Sc. Congr.* 5 (1953) 9) as an example of "bi-topical" genus — independently but convergently evolved from the *Plectranthus*-stock in two widely separated regions.

1. ***Ceratanthus longicornis*** (F. Muell.) G. Taylor in *J. Bot.* 74 (1936) 39, f. 2.

Plectranthus longicornis F. Muell. *Fragm. Phytogr. Austral.* 5 (1865) 51; *Benth. Fl. Austral.* 5 (1870) 76.

Perennial herb. Stems solitary or rarely branched from the base, tomentose or pubescent, thickened (sometimes nodiferous) and scaly in underground portion; 25-30 cm long including the inflorescence. Leave usually 2-3 pairs, obovate or oblong, 2.5-3.5 (-5) cm long, 1-1.5 cm wide, obtuse or rounded, the base attenuate; margins sinuate or coarsely toothed or subentire, hirsute on both surfaces; petioles 0.2-0.5 cm long. False whorls 6-8-, rarely 4-5-flowered, forming a terminal, slender raceme 10-15 cm long; bracts cordate, acuminate; pedicels 2-3 mm long. Calyx turbinate, widely opened, 1.5-2.5 mm long; upper lip formed of a broad, truncate and emarginate upper tooth with 2 smaller lateral teeth at its base; the lower lip obtuse and emarginate. Corolla obliquely campanulate, produced at the base a narrow conical, recurved spur; upper lip erect, broad, shortly 3-lobed; lower lip oblong, concave. Stamens included, the 2 upper ones inserted near the mouth, and the 2 lower, near the base of corolla-tube. Fruiting calyx accrescent, inflated, 2.5-3 mm long and broad; upper tooth recurved at the top and decurrent at the base; lower lip strongly concave and saccate. Nutlets globular, flattened, 1 mm across, glandulate.

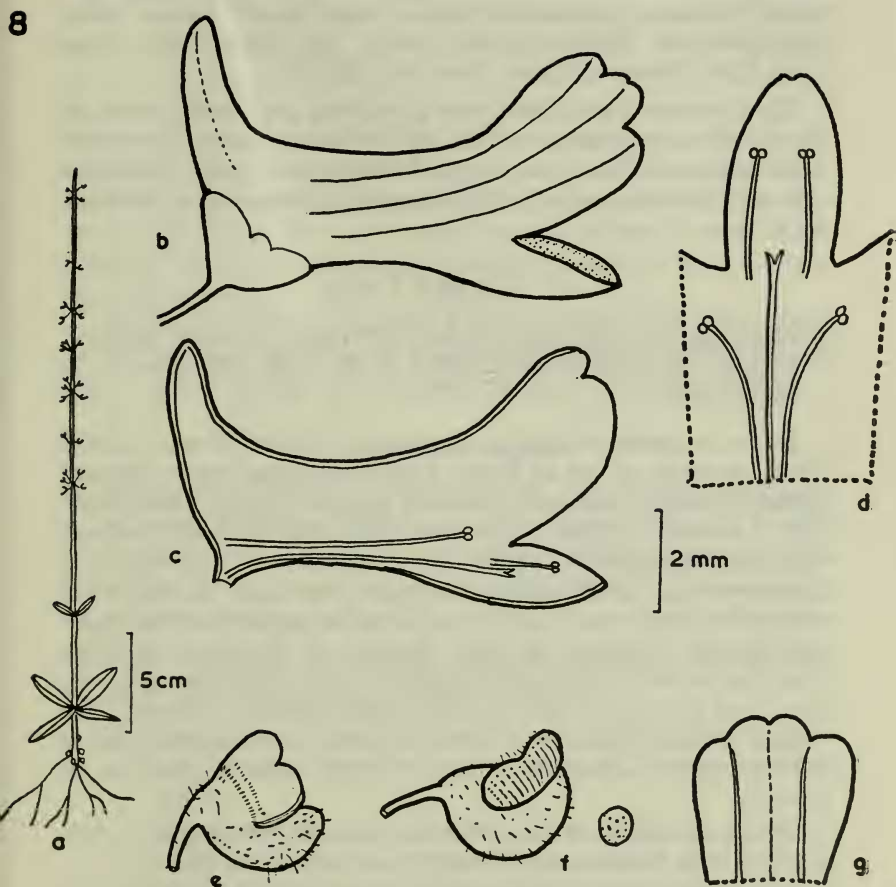


Fig. 8. *Ceratanthus longicornis* G. Taylor.

a. habit; b. flower; c. half of corolla; d. lower lip of corolla, expanded; e. & f. 2 views of fructing calyx; g. upper lip of corolla.
(Brass 8403)

Distribution: Australia (N. E. Queensland) and New Guinea (S. Papua).

Ecology: Common amongst grasses all over savannahs or on savannah ridges.

Specimens examined:

New Guinea: Wuroi, Oriomo River, W. Division, *Brass* 5692 (BM, K) (Stems, peduncles, petioles leaf-midribs purple tinged; flowers violet); Lake Daviumbu, Middle Fly River, *Brass* 7890 (BM). Tarara, Wassi Kussa River, Western Division, *Brass* 8403 (BM, K).

The description and illustration given here is primarily based on *Brass* 8403, a specimen identified by Sir George Taylor. It is somewhat different from the original description and illustration especially with reference to the shape and dimensions of the fruiting calyx.

9. COLEUS LOUR.

Coleus Lour. Fl. Cochinch. 2 (1790) 372; Benth. in Benth. & Hook. f. Gen. Pl. 2 (1876) 1176; Briq. in E. & P. Pfl. Fam. 4, 3a (1897) 359.

Herbs or subshrubs. Leaves opposite, petiolate. Flowers usually small, generally in lax or dense, 6-many flowered cymes, forming axillary spurious raceme or terminal panicles. Calyx subcampanulate, 5-toothed, 2-lipped, accrescent and often declinate in fruit. Corolla-tube exserted, long or short, straight or decurved; limb gibbous or less often straight, 2-lipped; the upper lip (3-) 4-fid, strongly recurved; the lower lip entire, much longer than the upper, boat-shaped, narrowed at base. Stamens 4, declinate; filaments fused below into a short tube around the base of style but generally free from the corolla-tube; anther-locules usually confluent. Disc usually produced anteriorly. Ovary 4-partite; style shortly 2-fid at the tip. Nutlets orbicular, oblong or ovoid, smooth, granulate or punctate.

Species about 90, in the tropics of the Old World and in Australia. About 5 species with 5 varieties are found in Malaysia.

It is rather controversial whether *Coleus* should be retained as an independent genus or should be incorporated into the genus *Plectranthus*. In Linnaeus's *Species Plantarum* (1753), the earliest known species of *Coleus* and *Plectranthus* were both included in the genus *Ocimum* (as *Ocymum*). As a consequence of emphasis on the presence of a tooth on the filaments of the upper stamens in some *Ocimum* species, a feature originally pointed out by Linnaeus, L'Heritier (1788) established the genus *Plectranthus* to accommodate the species without a tooth on the filaments and having a spur or an angle on the upper side of the corolla-tube. Loureiro (1790) further created the genus *Coleus* to contain the species with monadelphous androecium. Brown (1810), and Blume (1826) did not accept the genus *Coleus*, and placed the species in *Plectranthus*. However, Bentham and Briquet, two authors who wrote the monographs of the family Labiatae on a world-wide basis, and those

who compiled the regional flora of Malesia and neighbouring countries (notably Benthams, Hooker, Miquel, Prain, Merrill, Ridley, Backer & Bakhuizen van den Brink, Jr. and others), have generally accepted the genus *Coleus*.

Very recently, Morton [in J. Linn. Soc. Bot. 58 (1962) 242–249] after examining the West African material, strongly advocate a transference of all the *Coleus* species to *Plectranthus*. I fully agree with Morton that the separation of these two genera is “entirely arbitrary”. Nevertheless, I cannot help but think that the practice of the classification of such a natural family as Labiatae is basically an arbitrary one. Besides, should Morton’s generic concept of *Plectranthus* be accepted *in toto*, following his discussion and the key on P. 243, the most widely cultivated labiateous species in Malesian region, *Coleus scutellarioides* Benth., probably has to be reclassified under the genus *Solenostemon* Schum. *emend.* J. K. Morton, rather than under the genus *Plectranthus*. This appears to be unacceptable.

For these reasons, tentatively I regard *Coleus* and *Plectranthus* as two separate genera until a better delimitation of *Plectranthus* and its allied genera, on a world-wide basis, becomes available.

Key to the species

- A. False whorls densely many-flowered, subglobose; calyx-teeth at anthesis though different in shape, are subequal in length; in fruit, the uppermost calyx-tooth slightly accrescent and deflexed, the lower and lateral teeth all linear lanceolate or subulate, sharply pointed.
 - 1. *C. amboinicus*
- A. False whorls laxly few to many-flowered; calyx-teeth at anthesis or in fruit always very unequal in length.
 - B. Two lateral calyx-teeth usually short, with rounded or truncate (rarely mucronate in 2 varieties of *C. scutellarioides*) apices.
 - C. Corolla generally below 12 mm in length (except in *C. scutellarioides* var. *gibbseae* which can reach a length of 18 mm); lower calyx-teeth shorter, sometimes as long as, rarely slightly longer than the uppermost calyx-tooth.
 - 2. *C. scutellarioides*
 - C. Corolla above 15 mm in length; lower calyx-teeth manifestly longer than the uppermost tooth.
 - 3. *C. macranthus*
 - B. Two lateral teeth elongate, with acute or acuminate apices.
 - C. Spurious spikes 2–4 cm long; flowers 1–3 in a cyme; fruiting calyx 5–6 cm long, the uppermost tooth straight, 3–5-nerved.
 - 4. *C. spariflorus*
 - C. Spurious spikes 5–25 (–30) cm long; flowers 5–8 (–15) in a cyme; fruiting calyx 6–12 (–15) cm long, the uppermost tooth strongly reflexed, many-nerved.
 - 5. *C. galeatus*

1. *Coleus amboinicus* Lour. Fl. Cochinch. (1790) 372; Merr. in Philip. J. Sci. 7 (1912) Bot. 344, Enum. Philip. 3 (1923) 418; Back. & Bakh. f. Fl. Java 2 (1965) 637.

Plectranthus aromaticus Roxb. Fl. Ind. ed. 2, 3 (1832) 22, non Hort. Beng. (1814) 45.

Coleus aromaticus Benth. in Wall. Pl. As. Rar. 2 (1830) 16, in Bot. Reg. 18 (1832) t. 1520, Lab. Gen. & Sp. (1832) 51, in DC. Prodr. 12 (1848) 72.

Plectranthus amboinensis (Lour.) Spreng. Syst. 2 (1825) 690.

Majorana amboinica (Lour.) O. Kuntze, Rev. Gen. Pl. 1 (1891) 524.

Coleus suganda Blanco Fl. Filip. (1837) 438, ed. 2 (1845) 337, ed. 3, 2 (1878) 259; Benth. in DC. Prodr. 12 (1848) 71; Miq. Fl. Ind. Bat. 2 (1858) 948.

?*Coleus carnosus* Hassk. in Fl. Bot. Zeit. 5 (1842) 2; Benth. in DC. Prodr. 12 (1848) 79 (as *sp. dubiae*); Miq. Fl. Ind. Bat. 2 (1858) 953.

?*Coleus suborbicularis* Zoll. et Mor. in Moritz, Verz. Jav. (1845-46) 54.

A herb, more or less succulent, 0.3-1 m high. Stems and branches subterete, densely pubescent when young, glabrescent when old. Leaves thick, fleshy, broadly ovate, suborbicular or deltoid, 5-7 cm long, 4-6 cm wide, obtuse or rounded, the base rounded or truncate, often long-attenuate, sparsely pubescent on the upper surface, and hirsute on the nerves in the lower surface; petioles 2-4.5 cm long, pubescent. Flowers in dense, many (12-20 or more)-flowered cymes forming subglobose verticillasters disposed in terminal spike-like inflorescences, the rachis 10-20 cm long, fleshy and pubescent; bracts broadly ovate, 3-4 cm long, acute, subsessile. Calyx campanulate, 2-4 mm long, hirsute and glandulate, subequally 5-toothed, the upper tooth broadly ovate, acute, the lateral teeth narrowly lanceolate, the lower teeth slightly longer than the rest, highly connate. Corolla boat-shaped, 8-12 mm long, the tube 3-4 mm long, 2-lipped, the upper lip short, erect, puberulent, the lower lip long, concave.

Distribution: Possibly a native of India. Introduced and cultivated in Malesia for its aromatic leaves.

Ecology: Cultivated from lowland to about 1,000 m high.

Vern. names: Terbangun, Daun-djinten (Karo, Sumatra), Duganda (Tagalo, Philippines).

Specimens examined:

Sumatra: S. Ramboetan, alt. 900 m., Bünnemeijer 3389 (L); Karo Highlands, near Kabandjahe, alt. 1,200 m., Lörzing 14366 (L).

Java: Java, Horsfield Lab. 30 (K); Pasoeroean, Tengger, Koorders 37615 b (L); Bandung, alt. 700 m., Popta 351 (L).

Lesser Sunda Islands: Flores, *Voogd 1812* (L); Flores, Mt. Keli Moetoe, *Voogd 2005* (L); Timor, Beboki, *Voogd 2313* (L); Flores, Keo, alt. 1,500 m., *Voogd 2828* (L).

Borneo: Sarawak, alt. 1,000 m., *Brooke 10512* (BM).

Philippines: Luzon, Gavite, Maragondon, *Merrill sp. Blanco 129* (BM, K, L); Mindanao, Zamboanga, Malangas, *Ramos & Edano 36950* (K).

Merrill (1912), following the view held by F.-Villar, reduced *Coleus suganda* Blanco to a synonym of *Coleus amboinicus* Lour. I am included to think that *C. carnosa* Hassk. and *C. suborbicularis* Zoll. & Mor. (both from Java), are probably synonymous with *C. amboinicus* Lour. too. Although their lectotypes are not available, several specimens in various herbaria identified as these two species are indistinguishable from the latter species.

No fruiting specimen from this region has been found. Backer (1965, p. 637) recorded that "(calyx) after anthesis upto 6 mm long with a slightly oblique mouth".

2. *Coleus scutellarioides* (Linn.) Benth. in Wall. Pl. As. Rar. 2 (1830) 16, Lab. Gen. et Sp. (1832) 53, in DC. Prodr. 12 (1848) 73; Miq. Fl. Ind. Bat. 2 (1858) 949 (incl. varieties); Steenis in Bull. Jard. Bot. Buitenz. III, 13 (1934) 288; Back. & Bakh. f. Fl. Java 2 (1965) 637.

Ocymum scutellarioides Linn. Sp. Pl. ed. 2 (1762) 834; Burm. f. Fl. Ind. (1768) 130.

Polypodium ovatum Burm. f. Fl. Ind. (1768) 223.

Plectranthus scutellarioides (Linn.) R. Br. Prodr. (1810) 506; Bl. Bijdr. (1826) 837.

Plectranthus ingratus Bl. Bijdr. (1826) 836.

Plectranthus laciniatus Bl. Bijdr. (1826) 838.

Coleus atropurpureus Benth. in Wall. Pl. As. Rar. 2 (1830) 16, Lab. Gen. et Sp. (1832) 54, in DC. Prodr. 12 (1848) 74; Miq. Fl. Ind. Bat. 2 (1858) 951; Prain in J. As. Soc. Bengal 74 (2) (1907) 706; Ridley, Fl. Mal. Pen. 2 (1923) 646; Merr. Enum. Philip. 3 (1923) 418.

Coleus blumei Benth. Lab. Gen. et Sp. (1832) 56, in DC. Prodr. 12 (1848) 75; Merr. Enum. Philip. 3 (1923) 419.

Coleus acuminatus Benth. in Linnaea 6 (1831), DC. Prodr. 12 (1848) 73; Miq. Fl. Ind. Bat. 2 (1858) 950; Merr. Enum. Philip. 3 (1923) 418. *syn. nov.*

An observation on the living plants and a study of a large number of herbarium materials bear out that there are many variations of this most extensively cultivated species with reference to the colour, shape and size of the leaves. Take *Coleus laciniatus* (Bl.) Benth. (or *Plectranthus laciniatus* Bl.) as an example, this species is essentially characterized by its "*foliis ovatis acuminatis laciniatis aut inciso-serratis*". It has been demonstrated (Kuswata 1964, unpublished) that the type with lacinate leaf-margins and irregular venation can be raised from seeds of the form possessing shallowly dentate leaf-margins and regular venation. Rife [in Proc. Summer

9

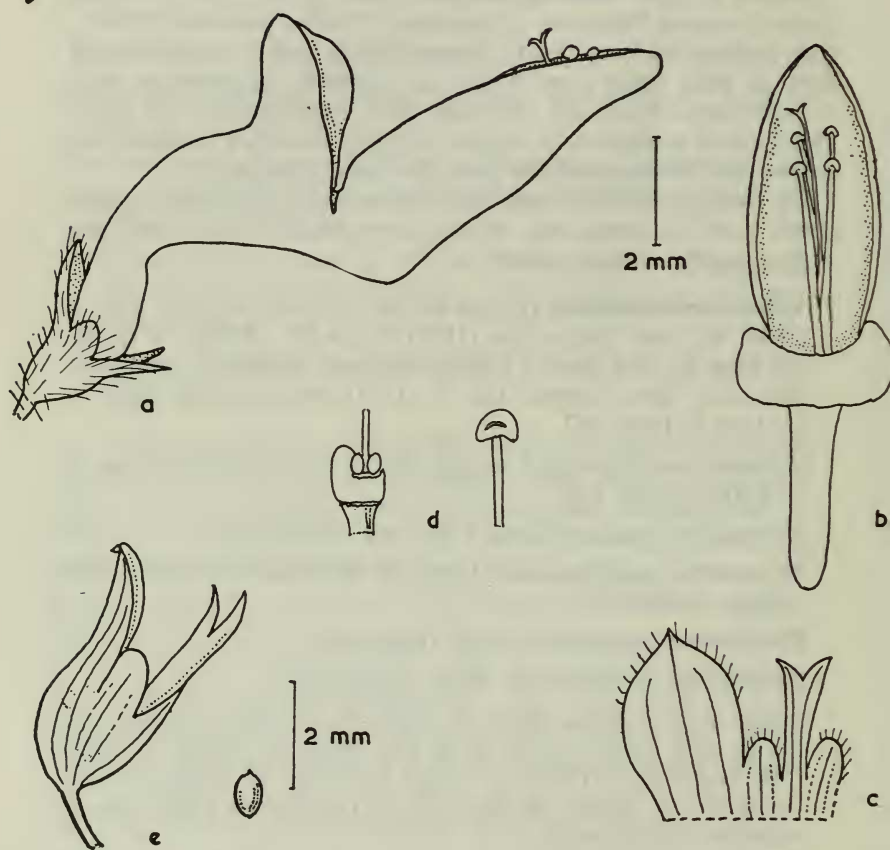


Fig. 9. *Coleus scutellarioides* Benth.

a. flower; b. corolla, seen from above; c. calyx expanded; d. stamen, ovary and nectary disc; e. fruiting calyx and nutlet (fresh material).

Sch. Bot. 1960, pp. 334–340] has shown conclusively that the difference merely resulted from a single gene. Therefore, Dr. Backer's (1965) broad concept of the species *Coleus scutellarioides* Benth. is accepted, with several varieties from definite geographic regions recognized and enumerated below:

Key to the varieties of *Coleus scutellarioides*

- A. Corolla usually below 12 mm long.
 - B. Upper calyx-lobe longer than or as long as the lower pair of calyx-teeth; lateral teeth with rounded or truncate apices.
 - a. var. *scutellarioides*
 - B. Upper calyx-lobe shorter than the lower pair of calyx-teeth.
 - C. Lateral calyx-teeth with rounded or truncate apices (Luzon, Philippines).
 - b. var. *crispipilus*
 - C. Lateral calyx teeth with mucronate or apiculate apices.
 - D. Upper calyx-lobe straight; peduncles of cymes and branches of thyse not elongated, thus flowers closely arranged in verticillasters. (Timor)
 - c. var. *grandifolius*
 - D. Upper calyx-lobe reflexed; peduncles of cymes and branches of thyse elongated, thus flowers laxly arranged in verticillasters. (Mindanao, Philippines).
 - d. var. *integrifolius*
 - A. Corolla 14–18 mm long; upper calyx-lobe longer than the lower pair of calyx-teeth; lateral teeth with rounded apices. (New Guinea)
 - e. var. *gibbseae*

2a. var. *scutellarioides*

A branched herb, 0.5–1 m high, erect or ascending. Stems and branches finely pubescent or glabrous. Leaves membranaceous, very variable in size, shaped and colour, generally ovate in outline, the blade 1–15 cm (generally 4–7 cm) long, 1–10 cm (generally 3–5 cm) wide, acute or acuminate, the base rounded or cuneate, entire, margins elsewhere crenate, serrate, remotely crenate or sometimes lacinate, pubescent on the main and secondary veins; petioles 1–5 (–8) cm long. Flowers in irregularly branched cymes disposed in simple or branched thyrses 5–10 (–25) cm long, 3–5 (–8) cm across; peduncles of the lateral cymes short or elongated; bracts ovate-acute, pubescent, 2–3 mm long; deciduous. Calyx obliquely campanulate, 10-nerved, 2–2.5 mm (in fruit 4–6 mm) long, hirsute and sparingly gland-dotted, unequally 5-toothed; the upper tooth broadly ovate, subacute; the two lateral teeth oblong-obtuse, truncate or rounded, vary short; the two lower teeth subulate, connate; pedicels 3–4 mm long, pubescent. Corolla boat-shaped, 8–13 mm long, puberulent, the tube abruptly decurved, the upper lip short, erect, the lower lip long, concave, enclosing the stamens and most part of the style. Stamens in 2 pairs; filaments connate beyond the point of attachment to the corolla-tube. Nutlets broadly ovate or orbicular, brown, shining, 1–1.2 mm long.

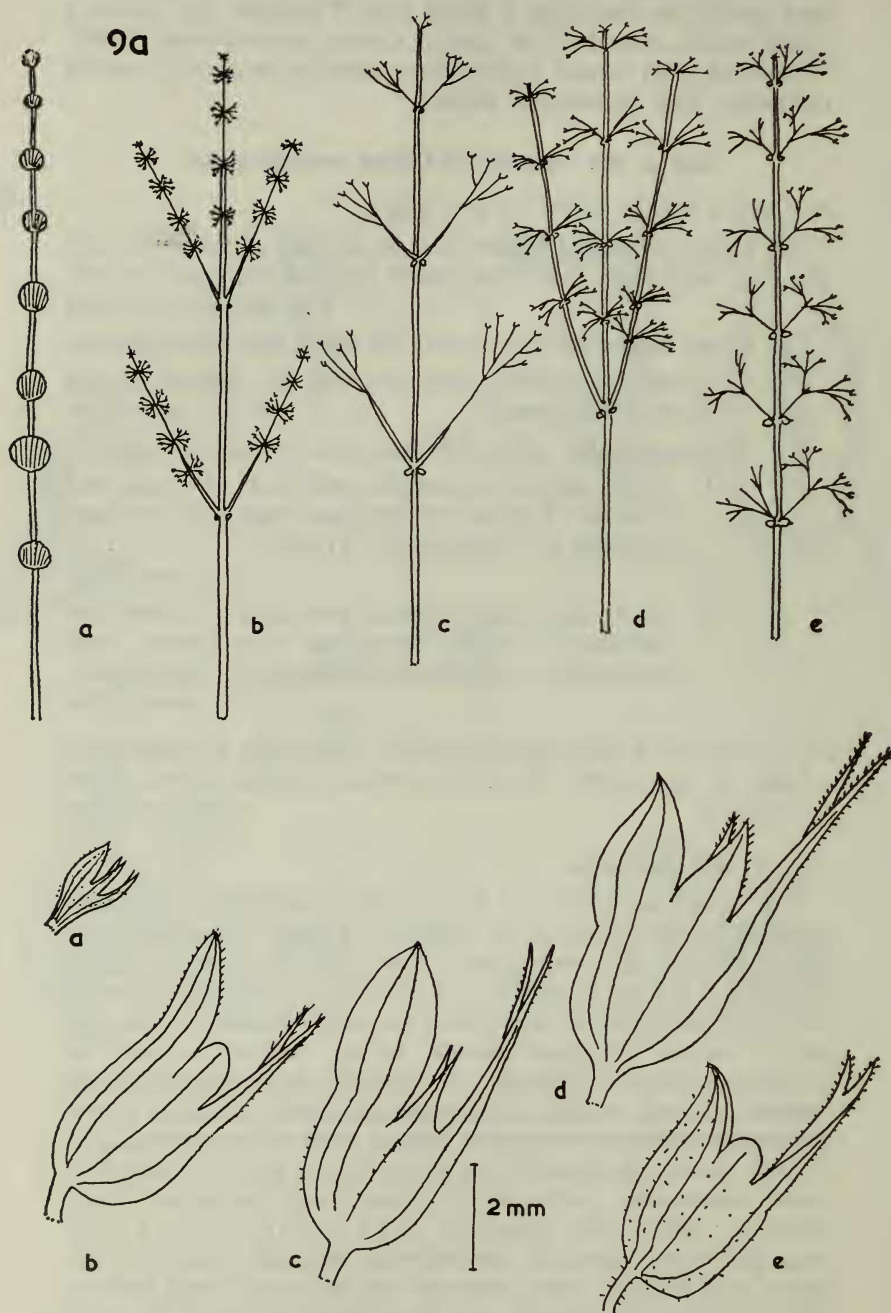


Fig. 9a. Diagrams of the inflorescences and sketches of the fruiting calyces of *Coleus*.

a. *Coleus amboinicus* Lour. (Lörzing 14366); b. *C. scutellarioides* Benth. (fresh material); c. *C. spariflorus* Elmer (Elmer 11646); d. *C. galeatus* Benth. (Backer 23267); e. *C. macranthus* Merr. (Merrill 4502).

Distribution: From India, Malesia to Polynesia.

Ecology: From lowland to high altitudes; generally cultivated for ornamentation, often escaped from cultivation.

Vernacular names: Djawer kotok (Java); Saribotang oeding; Piladang; Boengo piladang (Sumatra); Ati-ati; Dune Ati-ati; Hatisolo; Aroem gara (Malaya Peninsula); Ati-ati kedoyak, Myana (Borneo); Ton kau (Moluccas); Lampunaga; Sahemaya; Mayana (Philippines); Boedimoe pap (New Guinea).

Specimens examined:

Sumatra: Simaloer, *Achmad* 351 (L); Sumatra, *Batten Pool* s.n. 1939 (Sing.); Banka, P. Lepar, alt. 75 m., *Bunnemeijer* 2369 (L); Bt. Tinggi, alt. 1,000 m., *Bunnemeijer* 3038 (L); G. Malintang, alt. 1,100 m., *Bunnemeijer* 3510 (L); G. Sago, alt. 1,050 m., *Bunnemeijer* 3647 (L); G. Merapi, alt. 1,200 m., *Bunnemeijer* 5075 (L); G. Talang, alt. 1,400 m., *Bunnemeijer* 5159 (L); P. Singkep, alt. 30 m., *Bunnemeijer* 7228 (L); Telok, Bt. Ranggal, alt. 100–349 m., *Elbert* s.n. 1903 (L); Archipelago, Ind. Blalauw, alt. 3,000 m., *Forbes* 1881 (L); Palembang, Moeara, alt. 150 m., *Grashoff* 483 (L); Lampung, G. Rate Berenong, alt. 400 m., *Iboet* 256 (L); Sibolangit, alt. 500 m., *Lorzing* 5344 (L); Asahan, *Merrill* 79 (L); Gajo Loeas, *Pringo Atmodja* 220 (L); Palembang, *Praetorius* s.n. (L); Batoe, *Raap* 387 (L); Palembang, 600 m., *Voogd* 1522 (L); East Coast, *Yates* 1165 (L).

Malay Peninsula: Malacca, *Burkill* 3515 (Sing.); Perak Tanjong Malim, *Burkill & Haniff* 13500 (Sing.); Perak, Tapah, *Burkill & Haniff* 13527 (Sing.); Perak, Grik, *Burkill & Haniff* 13647 (Sing.); Pahang, Burtong, *Burkill & Haniff* 16536 (Sing.); Pahang, Pekan, *Burkill & Haniff* 17228 (Sing.); Penang, *Curtis* 466 (Sing.); Johore, Pulau Aor, *Feilding* s.n. Oct. 1892 (Sing.); Perak, Telok Anson, *Haniff* 10315 (Sing.); Perak, Batu Kurau, *Haniff Sa'ah* 13272 (Sing.); Perak, Tapah, *Haniff* 13971 (Sing.); Perak, Kota Lawa, Kuala Kangsar, *Haniff* 15562 (Sing.); Perak, Hutan Melintang, *Haniff* 15912 (Sing.); Perak, Kota Stia-Telok Anson, *Haniff* 15924 (Sing.); Perak, Telok Anson *Haniff* 15945 (Sing.); Perak, Lubok Merbok, Kuala Kangsar, *Haniff* 15985 & 16004 (Sing.); Lower Perak, Telok Anson, Bagan Datoh, *Haniff* 16273 (Sing.); Perak, Telok Anson, K. Gajah, *Haniff* 16299 (Sing.); Perak, Taiping, *Henderson* 10107 (Sing.); Singapore, Ang Mo Kio, *Ridley* 112 (Sing.); Singapore, Choa Chu Kang, *Ridley* s.n. Oct., 1889 (Sing.); Singapore, Kuala Lumpur, *Ridley* s.n. 1890 (Sing.); Singapore, Sungei Jurong, *Ridley* s.n. 1890 (Sing.); Singapore, Bukit Timah, *Ridley* s.n. 1894 (Sing.); Singapore, Pulau Damar, *Ridley* s.n. 1897 (Sing.); Singapore, Galang, *Ridley* s.n. Feb. 1898 (Sing.); Trengganu, Bendi, *Rostados* s.n. Feb. 1890 (L); Penang, Pulau Betong, *Sinclair* 39316 (L, Sing.); Perak, Jenah, alt. 70–100 m., *Wray Jr.* 1759 (L).

Java: Batavia, *Backer* s.n. 1905 (L); Soekaboemi, alt. 800 m, *Backer* 15205 (L); Madoera, P. Puteran, alt. 50 m, *Backer* 20832 (L); Batavia, Wanajasa, alt. 750 m, *Bakhuizen v/d Brink* 4730 (L); Batavia, G. Parang, alt. 700 m, *Bakhuizen v/d Brink* 4979 (L); Java, *Blume* s.n. (L) (several collections); G. Parang, *Blume* 992 (L); Tjibereum Tjomas, *Boerlage* 219 (L); Pelaboean Ratoe, *Boerlage* s.n. 1888 (L); Bogor Hortus, *Hallier* D. 268, 269, 270, 271 & 275 (L); Patoea, *Holstvoogd* 425 a (L); Tegal, *Holstvoogd* 578 b (L); Bawean, *Karta* 163 (L); Tjibodas, alt. 1,400 m, *Raap* 759 (L); Batavia, Tjibogea, alt. 250 m, *Schiffner* 2478 (L); Bogor, *Soegandiredja* 140 (L); Java, *Waitz* s.n. (L) (several collections); Java, *Zollinger* s.n. (L).

Lesser Sunda Islands: Timor, Coepang, *Brown* s.n. April 1803 (BM); Timor, Moetis, alt. 1,800 m, *Voogd* 2308 (L).

Borneo: Sandakan, Bambang, *Dagong bin Bakir* A 2745 (Sing.); Borneo, *Delmaar* 1969 (L); Sandakan, *Kadir* A 1658 (L, Sing.); Sandakan, *Kadir* A 2789 (Sing.); Sarawak, Sungei Tau, alt. 100 m, *Purseglove* P. 5166 (L, Sing.).

Philippines: Mindoro, Mt. Yagaw, alt. 460 m, *Conklin 761* (L); Samar, *Cuming 1683* (BM, K) (type of *C. acuminatus* Benth.); Mindanao, Lanao, Cristina Falls, *Ebalo 1200* (Sing.); Luzon, Illocos Norte, Mt. Quebrada, alt. 110 m, *Edano 3752* (L); Mindanao, Zamboanga del Norte, Jipay, *Frake 146* (L); Luzon, Rizal, Pasig, Barrio of Pineda, *Merrill sp. Blanco. 190* (L); Luzon, Manila, *Merrill 786* (L); Luzon, Rizal, Antipolo, *Ramos 22284* (L); Luzon, Laguna, *Ramos 24104* (L, Sing.); Luzon, Rizal, Mt. Irig, *Ramos s.n.* Feb. 1923 (L).

Celebes: Lombasang, alt. 950 m, *Bunnemeijer 11126* (L); G. Bonthain, *Bunnemeijer 12288* (L); Sidenren-rapang, alt. 20 m, *Eyma 318* (L); Masimboelong Enrekang, alt. 2,500 m, *Eyma 995* (L); Enrekang, alt. 1,200 m, *Eyma 1082* (L); Loewoek, Menado, *Eyma 3799* (L); Celebes, *Forsten s.n.* (L); Minahassa, Menado, alt. 200 m, *Koorders 17364* (L); Pakoe-oere, alt. 400 m, *Koorders 17365* (L); Minahassa, Menado, alt. 10 m, *Koorders 17371* (L); Minahassa, alt. 5 m, *Lam 2444* (L); Kg. Patimping, *Noerkas 260* (L); Pasang Kajoe, *Rachmat 195* (L); Celebes, *Teysmann s.n.* 1869 (L).

Moluccas: Tanimbar, Jamdena, *Borssum Waalkes 3270* (L); Aroe, Kep. Ngaibor, alt. few m, *Buwalda 5353* (L); Ceram, Kep. Kiandarat, alt. few m, *Buwalda 5789* (L); Ceram, Roho, alt. 100–200 m, *Kornassi 517* (L); Ceram, alt. nil, *Kornassi 760* (L); Ceram, Tusschen Seti Konoesi, alt. 200–500 m, *Rutten 404* (L); P. Bisa, *Saanan 51* (L); Bara, G. Fogha, *Stresemann 375 a* (L); Ceram, Ambon, *Wiljes-Hissink 122* (L).

New Guinea: New Guinea, *Atasrip 43* (L); Okaba, *Branderhorst 65* (L); Northern New Guinea, alt. 5 m, *Gjellerup 110* (L); Merauke, *Koch s.n.* Aug. 1904 (L); Doorman River, alt. 240 m, *Lam 1387* (L); Bismarck Archipelago, *Lauterbach 135* (L); New Guinea, *Leeuwen 9236, 9523, 10507 & 10733* (L); Southern New Guinea, alt. 40 m, *Pulle 1243* (L); Amboina, *Robinson 473* (BM, L); Southern New Guinea, *Versteeg 1710* (L).

2b. *Coleus scutellarioides* Benth. var. *crispipilus* (Merr.)

comb. nov. et stat. nov.

Coleus pumilus Blanco Fl. Filip. (1837) 482, ed. 2 (1845) 336, ed. 3, (1878) 257; Benth. in DC. Prodr. 12 (1848) 78; Miq. Fl. Ind. Bat. 2 (1858) 956; Merr. Enum. Philip. 3 (1923) 420.

Coleus gaudichaudii Briq. in Ann. Conserv. Jard. Bot. Geneve 2 (1898) 237.

Plectranthus monadelphus Llanos ex F.-Vill. & Naves in Blanco Fl. Filip. ed. 3, 4 (1880) 105, non Roxb.

Coleus macranthus Merr. var. *crispipilus* Merr. in Philip. J. Sc. 1 (1906) suppl. 234.

Coleus crispipilus Merr. in Philip. J. Sc. 5 (1910) Bot. 382, Enum. Philip. 3 (1923) 419.

Coleus pubescens Merr. in Philip. J. Sc. 3 (1908) Bot. 432, Enum. Philip. 3 (1923) 420. *syn. nov.*

Coleus zschokkei Merr. in Philip. J. Sc. 5 (1910) Bot. 382, Enum. Philip. 3 (1923) 420. *syn. nov.*

Coleus formosanus Hayata in Matsum. & Hayata, Enum. Pl. Formos. (1906) 320; Kudo in Mem. Fac. Sc. & Ag. Taihoku Un. II, 2 (1929) 145.

The shape and size of the leaves of this variety are varying from ovate or reniform and small (3–4 by 2.5–3 cm) to broadly ovate and large (10–13 by 8–9.5 cm). It can be easily recognized by the fused lower calyx-teeth which are invariably much longer than the strongly reflexed uppermost calyx-lobe.

Type: Suyoe to Panai, Benguet, Luzon, *Merrill 4780* (isotype, K).

Distribution: Malesia (Luzon, the Philippines) and Formosa (Botel Tobago Island only).

Ecology: In thickets or on open dry slopes at low altitudes, and also in mossy forest at higher altitudes (2,000–2,500 m).

Specimens examined:

Philippines: Luzon, Rizal *Ahern 3420* (K); Luzon, Benguet, Pulog, *Curran, Merrill & Zschokke 16146* (BM) & *16325* (K); Luzon, Zambales, Mt. Aglao, *Edano 26775* (K); Luzon, Bataan, Mt. Mariveles, *Elmer 6720* (K, L); Luzon, Benguet, Baguio, *Elmer 8342* (K, L); Luzon, Tayabas, Lucban, *Elmer 9170* (K, L); Luzon, Sorsogon, Irosin, Mt. Bulusan, *Elmer 15513* (K, L); Luzon, Laguna, Los Bano, Mt. Maquiling, *Elmer 17693* (L); Babuyan Isls. *Fenix 3892* (BM) (isotype of *Coleus pubescens* Merr.); C. Luzon, *Loher 4229, 4230 & 5038* (K); Luzon, Rizal, *Merrill sp. Blanco 190* (K); Culion Isl., *Merrill 455* (K); Luzon, Suyoe to Panai, Benguet, *Merrill 4780* (K) (isotype of *Coleus crispipilus* Merr.); Luzon, Pampanga, Mt. Arayat, *Merrill 3911* (K, L); Manila, *Merrill 3940* (K); Luzon, Benguet, Mt. Pulog, *Merrill 6529* (BM, K) (isotype of *Coleus zschokkei* Merr.); Manila, *Merrill 8017* (K, L); Luzon, Cavite, Talisay Ridge, *Merrill 10625* (K, L); Luzon, Abra, *Ramos 7069* (L); Camarine, Mt. Isarog, *Ramos 22108* (K, L); Luzon, Rizal, Antipolo, *Ramos 22284* (K); Luzon, Sorsogon, *Ramos 23482* (K, L); Luzon, Ilocos Norte, Banguì, *Ramos 27496 & 27660* (K, L); Luzon, Rizal, Mt. Lumutan, *Ramos & Edano 29667* (K, L); Luzon, Ilocos, Burgos, *Ramos 32747* (K); Luzon, Rizal, Mt. Irig, *Ramos 41976* (K); Luzon, Rizal, *Reillo 19228* (K); Luzon, Laguna, Mt. Maquiling, *Servina 16901* (L); Luzon, Manila, *Vidal 3486* (K); Luzon, Bataan, Lamao River, *Whitford 185* (K, L).

The interpretation of Blanco's *Coleus pumilus* is based on Merrill's *Sp. Blanco no. 190* (From Rizal, Luzon; Oct. 1914).

With the broad concept of *Coleus scutellarioides* Benth. in mind, I naturally thought of reducing *Coleus pumilus* Blanco to a variety status. I am very pleased to note that Mr. K. Kuswata, who conducted an experimental study on cultivated *Coleus* in the University of Singapore, came to the same conclusion in his unpublished dissertation for the B.Sc. degree with Honours, University of Singapore.

Merrill has earlier (1923) pointed out that *Coleus gaudichaudii* Briq. is synonymous with *C. pumilus* Blanco. In addition, after examining the isotypes of the following species: *Coleus zschokkei* Merr. (Mt. Pulo, Benguet, Luzon, *Merrill 6529*, (K), May, 1909), *C. pubescens* Merr. (Babuyan, *Fenix Bur. Sc. 3892* (BM), June 12, 1908), and *Coleus crispipilus* Merr. (Suyoc to Panai, *Merrill 4780* (K), Nov. 1905), I failed to find any substantial differences between these and *Coleus pumilus* Blanco [except in *C. pubescens* Merr., the leaves are sometimes much larger (up to 13 by 9.5 cm), more pubescent, and the thyrses vary from 10 to 20 cm long, densely flowered]. Therefore, I add them to the synonym list.

Type specimens of *Coleus multiflorus* Benth. (Lab. Gen. & Sp.; "in Ins. Manilla, Perrottet", in Herb. Mus. Par.) have not been studied. Specimens identified and distributed by Merrill are merely a narrow-leaved and less pubescent form of *Coleus pubescens* Merr. which I consider a synonym of *C. scutellarioides* var. *crispipilus*.

2c. ***Coleus scutellarioides* Benth. var. *grandifolius* (Benth.) stat. nov.**

Coleus grandifolius Benth. Lab. Gen. et Sp. (1832) 54.

Leaves thin membranaceous, 10–12 cm long, 6–8 cm wide, acute, abruptly narrowed into an acumen nearly 2 cm long, the base rounded, entire, margins elsewhere coarsely dentate. Inflorescences 9–10 cm long; flowers 12–16 closely arranged in each verticillaster. Corolla 10–12 mm long.

A variety characterized by the ovate lateral calyx-teeth with a shortly apiculate or mucronate apex.

Type: Timor, *Guichenot s.n.* (type duplicates, K, L.)

Distribution: Endemic to Malesia (Timor).

Specimens examined: The type duplicates only.

2d. ***Coleus scutellarioides* Benth. var. *integrifolius* (Elm.) stat. nov.**

Coleus integrifolius Elm. Leaflet. Philip. Bot. 7 (1915) 2696; Merr.

Enum. Philip. 3 (1923) 419.

Leaves ovate, 7–13 cm by 3–6 cm, the apex acute, the base rounded-acute, entire, margins elsewhere finely crenate; petioles 4–6 mm long. Calyx 2–3 mm (in fruit 4–5 mm) long, the two lower teeth (nearly completely fused except the tips) longer than the other three. Corolla 8–9 mm long, strongly curved near the base. Inflorescence in fruiting 20–25 cm long, 3–5 cm across.

This variety is characterized by the lateral calyx-teeth with mucronate apices, and by elongated peduncles and side branches of the thyrses.

Type: Cabadbaran (Mt. Urdaneta), alt. 660 m, Agusan, Mindanao, *Elmer 13627*, (BM, K, L) Aug. 1912.

Distribution: Endemic to Malesia (Mindanao, Philippines).

Ecology: on slopes and steep shaded banks of streams, altitude 400–600 m.

Vern. name: Harinayam (Mindanao).

Specimens examined:

Philippines: Luzon, Sorsogon, Irosin (Mt. Bulusan), *Elmer 15358* (BM, K, L); Mindanao, Agusa, Cabadbaran (Mt. Urdaneta), *Elmer 13627* (BM, K, L) (isotype of *Coleus integrifolius* Elm.).

2e. ***Coleus scutellarioides* Benth. var. *gibbseae* (S. Moore) stat. nov.**

Coleus gibbseae S. Moore in L. S. Gibbs, Phytogeogr. & Fl. Arfak Mts. (1917) 178.

Leaves narrowly ovate or ovate-lanceolate, 1.5–2.5 cm by 0.5–0.8 cm, acute or acuminate, the base cuneate, entire, the margins elsewhere serrate; petioles subsessile to 0.6 cm long. Inflorescence 15–25 cm long; flowers compactly arranged in verticillasters. Corolla 1.5–1.8 cm long, if fully expanded.

This variety differs from the typical form of the species in the smaller and narrower leaves and the much longer corolla.

Types: N. W. New Guinea, Arfak Mts. alt. 2,300 m *L. S. Gibbs* 5909 (BM, holotype of *Coleus gibbseae* S. Moore; isotypes in K, L).

Distribution: Endemic to Malesia (New Guinea).

Ecology: On forest floor, altitude 1,800–2,900 m.

Specimens examined:

New Guinea: Arfak Mts., Angi Lakes, alt. 2,300 m, *Gibbs* 5909 (Types BM, K, L); Wissel Lake region, 1,800–2,900 m, *Eyma* 5026 (L); Star Mts. Sibil Valley, alt. 1,200 N 1,300 m, *Kalkman* 4167 (L); Arfak Mts. Angi Gita Lake, *Kostermanns* 2158 (L), Merauke, S. New Guinea, *Versteeg* 1833 (L).

3. *Coleus macranthus* Merr. in Philip. J. Sci. 1 (1906) Suppl. 234, 5 (1910) Bot. 382, Enum. Philip. 3 (1923) 419.

Erect, branched herb, 1–2 m high. Stems and branches rusty pubescent when young. Leaves membranaceous, ovate, oblong-ovate or narrowly rhomboid, 4–12 (–15) cm long, 1.5–5 (–7) cm, acute or broadly acute, the base rounded, subtruncate or acute, always entire and decurrent; margins elsewhere serrate or remotely dentate; puberulent on both surfaces but with more punctate glands beneath; petioles 2–6 (–7) cm long, slender. Flowers 5–9 (rarely more) in short cymes arranged in terminal or subterminal thyrses; thyrses 15–25 cm (in fruit to 30 cm) long, 4–5 cm across; rachis glandular puberulent; bracts lanceolate, 2–3 mm long, deciduous. Calyx campanulate, glandulate puberulent without, 4–7 mm (in fruit, 8–12 mm) long, the upper tooth broadly ovate, acute, the lateral teeth short and rounded, the lower teeth linear lanceolate, connate, longer than the rest. Corolla 1.5–2 cm long, slightly puberulent, the upper lip short and 3-lobed, the lower lip concave. Nutlets ovoid, 1.2–1.6 mm long, glabrous.

Types: The Philippines, Luzon: Mt. Data, Lapanto, *E. D. Merrill* 4502, 4505 (isotypes, BM, K, L, Sing.).

Distribution: Endemic to Malesia (Luzon, the Philippines).

Habitat: In mossy forests at about 2,200 m.

Specimens examined:

Philippines: Luzon, Benguet, Bagulo, *Elmer* 8529 (K, L); Luzon, Pampanga, Mt. Pinatubo, Camp Stotsenburg, *Elmer* 22172 (L); Luzon, Arayat, *Loher* 4193 (K); Benguet, *Loher* 4194 (K); Luzon, Data, *Loher* 4195 (K); Mt. Data, *Merrill* 4502 & 4505 (BM, K) (Isotype); Luzon, Lepanto, Mt. Data, *Ramos & Edano* 40283 & 40298 (K, L); Luzon, Lepanto, Mt. Sinapsapan, *Ramos & Edano* 40452 (L); Luzon, Benguet, Pauai, *Santos* 32034 (BM, K).

Among the specimens cited above, two of them, *Ramos & Edano* 40283 (K, L) and *Ramos & Edano* 40298 (K, L) bear *Merrill's* handwritings as "*Coleus macranthus* var. *stenophyllus* Merr." and "*Coleus longipes* Merr." respectively. I failed to find any difference from the typical form of the species, except that in the former, the leaves are remarkably narrower. Both names are not published.

4. *Coleus sparsiflorus* Elm. Leaf. Philip. Bot. 7 (1915) 2699; Merr. Enum. Philip. 3 (1923) 420.

Coleus scutellarioides Elm. l.c. (1915) 2697, *non* Benth. 1830.

A suberect herb, 30–40 cm high, often branched below. Stems and branches glabrous, rooted on the lower parts. Leaves membranaceous, oblong-lanceolate or elliptic, 3–10 cm long, 1.5–4 cm wide, acute or caudate, the base cuneate, entire, elsewhere crenate-serrate or subentire; glabrous on both surfaces, the nerves hirsute or puberulent; petioles 1–2.5 cm long, slender. Flowers 1–3 in cymules disposed in short thyrses; thyrses terminal or on the upper leaf axils, 2–4 cm long and across, the rachis puberulent, 3–5 branched; bracts ovate, 8–10 mm long, acute. Calyx turbinate, 3.5–4 mm (in fruit 5–6 mm) long, glandulate and hirsute; the upper tooth rounded, 5-nerved (3 main nerves with 2 additional lateral ones); the lateral teeth deltoid, pointed; the lower teeth lanceolate, pointed, connate below, longer than the rest. Corolla boat-shaped, 10–18 mm long, the tube decurved, the limb 2-lipped. Stamens in 2 pairs. Nutlets (?immature, *Elmer 13614*) oblong-cylindric, 1.4 mm long.

Type specimens: Todaya (Mt. Apo) Davao District, Mindanao, *Elmer 11646* (isotypes, BM, K, L). Sept. 1909.

Distribution: Endemic to Malesia (Mindanao, the Philippines).

Ecology: In damp forest, alt. about 1,200 m.

Specimens examined:

Philippines: Mindanao, Mt. Apo (Todaya), Davao, *Elmer 11646* (isotypes, BM, K, L), Mt. Urdaneta, Agusan, *Elmer 13614* (isotypes of *Coleus scutellarioides* Elmer, BM, K, L), Mt. Malindang, Misamis, *Mearns & Hutchinson 4662* (K), Mt. Mayo, Davao, *Ramos & Edano 19424* (Sing.), Mahilucota River, Bukidnon, *Ramos & Edano 38672* (K, L).

Isotypes of *Coleus scutellarioides* Elmer (a later homonym of *Coleus scutellarioides* Benth.), *Elmer 13614*, have been examined, they proved to be identical to *Coleus sparsiflorus* Elmer. Thus confirmed the reduction made by Merrill in 1923.

5. *Coleus galeatus* (Poir.) Benth. Lab. Gen. & Sp. (1832) 56, in DC. Prodr. 12 (1848) 76; Miq. Fl. Ind. Bat. 2 (1858) 955; Back. & Bakh. f. Fl. Java 2 (1965) 637.

var. *galeatus*

Germanea galeatus Poir. Encyc. 2 (1788) 763.

Plectranthus galeatus Vahl, Symb. Bot. 1 (1790) 43.

Plectranthus bicolor Bl. Bijdr. (1826) 837.

Coleus bicolor (Bl.) Benth. Lab. Gen. & Sp. (1832) 55, in DC. Prodr. 12 (1848) 75. *syn. nov.*

Plectranthus macrophyllus Bl. Bijdr. (1826) 835.

Coleus macrophyllus (Bl.) Benth. Lab. Gen. & Sp. (1832) 55, in DC. Prodr. 12 (1848) 75. *syn. nov.*

Coleus remotiflorus Miq. Fl. Ind. Bat. 2 (1858) 954. *syn. nov.*

Coleus spectabilis Miq. l.c. 2 (1858) 955. *syn. nov.*

Coleus macropus Miq. l.c. 2 (1858) 956.

A slender herb, up to 1 m high, erect or ascending, sparsely branched. Stems and branches rusty pubescent when young. Leaves varying from oblong to broadly ovate, mostly ovate, 6–12 (–18) cm long, 3–8 (–13) cm wide, acute or acuminate, the base rounded or shortly cuneate, subentire, margins elsewhere irregularly crenate, glabrous above, pubescent on the nerves below; petioles 3–10 cm long, very slender, puberulent. Flowers 5–8 (rarely up to 15) in very short cymes disposed in terminal and axillary thyrses; thyrses 5–15 cm long, 4–5.5 cm across, often branched at the base; rachis rusty-sericeous; bracts subulate, 2–3 mm long, deciduous. Calyx subcampanulate, sericeous and gland-dotted, 3–5 mm (in fruit 7–8 mm) long, unequally 5-toothed; the upper tooth ovate, subacute, often strongly reflexed, the lateral teeth deltoid, acute at the apex, the lower teeth lanceolate-subulate, connate, longer than the rest, accrescent in fruit. Corolla 1.5–2 cm long, puberulent, the tube very slender below, slightly gibbous at the base, abruptly decurved above; limb 2-lipped; the upper lip short and erect, the lower lip concave; filaments partly exerted. Nutlets broadly ovoid, 1 mm long.

Distribution: Endemic to Malesia.

Ecology: In riverside or mountain forests, altitude from 350–1,900 m.

Vern. names: Djawer kotok (Java), Boekoeham (Java), Selsioetan (Sumatra).

Specimens examined:

Sumatra: W. G. Talamau, *Bunnemeijer* 559 (L); N. W. G. Talamau, *Bunnemeijer* 643 (L); S. Koeriman, alt. 850 m, *Bunnemeijer* 3300 (L); G. Malintang, alt. 1,200 m, *Bunnemeijer* 3741 (K, L); G. Kerintji, alt. 1,500 m, *Bunnemeijer* 9047 (L); Sumatra, *Forbes* 2164 (BM); Sibolangit, alt. 1,200 m, *Lorzing* 5744 (L); Bandarbaroe, alt. 1,250 m, *Lorzing* 6677 (L); Mt. Sago, alt. 900–1,200 m, *Meijer* 3346 (BM, L); Asahan, Loemban, *Rahmat Si Boeca* 7988 (L); Korinchi, *Robinson & Kloss s.n.* 1914 (BM); Palembang, G. Pakiwang, alt. 1,500 m, *Steenis* 3901 (L); Mt. Tanggamoos, alt. 800 m, *Voogd* 155 (L).

Java: G. Boender, *Backer s.n.* Aug. 1909 (L); G. Slamet, alt. 1,200 m, *Backer* 282 (L); Goea Gadjah, alt. 400 m, *Backer* 5959 (L); Denoe, alt. 400 m, *Backer* 8968 (L); G. Salak, Pasir Pogor, alt. 1,200 m, *Backer* 9146 (L); Nirmala, alt. 1,500 m, *Backer* 10715 (L); G. Argopoero, alt. 1,200 m, *Backer* 13224 (L); G. Gedeh, alt. 1,500–1,600 m, *Backer* 22269 (L); Pekalongan, Lebak barang, alt. 350 m, *Backer* 23267 (K, L); Preanger, Gandasoli, Halimoen, alt. 600 m, *Bakhuizen v/d Brink* 3145 (K, L); Batavia, Pasir Limoes, Boerangrang, alt. 1,100 m, *Bakhuizen v/d Brink* 4350 (K, L); Batavia, Pasir Dalem, *Bakhuizen v/d Brink* 5520 (K, L); Java, *Blume* 2037 (lectotype of *Plectranthus bicolor* Bl.) & 2038 (L); Tjibodas, *Boerlage s.n.* (L) (several collections); G. Papandajan, alt. 1,900 m, *Coert* 589 & 590 (L); G. Patoeha, alt. 2,000 m, *Coert* 617 (L); Preanger Malabar, alt. 1,200–1,400 m, *Denker* 99 (L); Java, *Forbes* 712 (BM, L); Java, *Forbes* 739 (K, L); Tjibodas, *Hallier* 109 & 479 (L); Tjibodas, Sindanlaja, G. Gede, *Harrevelde s.n.* Aug. 1907 (L); G. Salak, *Hasselt* 640 (L); Taloen, *Ind.* 160 (L); Java, *Junghuhn* 57 (K, L); Bandoeng,

Pengalengan, *Kartamah* 409 (L); G. Gedeh, alt. 1,400 m, *Kern* 8297 (L); Preanger, Tjibodas, alt. 1,450 m, *Koorders* 31904 B (L); G. Karang, *Koorders* 40711 B (L); Java, alt. 1,500 m, *Koorders* 42585 (K); Besoeki, Kalibendo, alt. 200 m, *Koorders* 43194 & 43196 B (L); Java, *Korthals s.n.* (BM); G. Patoeha, *Korthals s.n.* (L); G. Talagabodas, *Korthals s.n.* (L); Lembang, *Korthals s.n.* (L); Preanger, Kamodjan, alt. 1,600 m, *Leeuwen-Reymaan* 2441 (L); Preanger, G. Mandalagiri, alt. 1,650 m, *Lam* 23 (L); Buitenzorg, alt. 650 m, *Lieftinck s.n.* Dec. 1940 (L); G. Tlrep, alt. 1,750 m, *Lorzing* 597 (L); Tjipetir, *Monchy s.n.* May 1890 (L); Tjibodas, *Monchy s.n.* May 1890 (L); Tjibodas, alt. 1,600 m, *Pleyte* 90 (L); G. Salak, alt. 1,200 m, *Raap* 159 (L); Tjibodas, alt. 1,400 m, *Raap* 664 (L); Tjibodas, Tjisaroea, *Raap* 849 (L); G. Oeroeg, alt. 2,000 m, *Rant* 343 (L); Mt. Salak, *Ridley s.n.* Feb. 1915 (K); Batavia, G. Pasir-Angin, alt. 500 m, *Schiffner* 2474 (L); Preanger, G. Kantjana, *Soegandiredja* 27 (L); G. Papandajan, alt. 2,200 m, *Steenis* 4026 (L); Mt. Patoeha, alt. 1,800 m, *Steenis* 5873 (L); Tjisaroea, alt. 1,020 m, *Steenis* 12747 (L); G. Melatti, *Went s.n.* (L); Boerangrang, alt. 1,100 m, *Wisse* 1236 (L); Java, *Zippelius s.n.* (L); Java, *Zollinger* 1709 (BM, L).

Lesser Sunda Islands: Bali, G. Pala, alt. 475 m, *Sarip s.n.* Sept. 1918 (L).

Moluccas: Moluccas, *Zippelius s.n.* (L).

The lectotypes, type duplicates or their fragments of the following Javanese species have been studied: (1) *Plectranthus bicolor* Bl. "Java, ad pedem montis Salack", *Blume s.n.* (L); (2) *Plectranthus macrophyllus* Bl. "Java, sylvaticis montosis" *Blume s.n.* (L); (3) *Coleus remotiflorus* "Java, in Soerakerta" *Horsfield Lab.* 112, (Bm, K, U 76818A); (4) *Coleus spectabilis* Miq. "Java, in Blam-bangan" *Horsfield s.n.* (Bm, K, U 69541). They proved to be identical with *Coleus galeatus* Benth.

5a. *Coleus galeatus* Benth. var. *borneensis* var. *nov.*

A typo differt racemis et pedunculo elongatis, calycis fructiferi magis.

Type: Penataran Basin, alt. 1,000 m, *Clemens* 34199 (L).

Distribution: Endemic to Malesia (Borneo).

Ecology: In dipterocarps and oak forests, altitude 1,000–1,800 m.

Specimens examined:

Borneo: Ranau, alt. 1,300 m, *Badak san.* 32378 (K); Mt. Kinabalu, E. Shoulder, alt. 1,000 m, *Chew, Corner & Stainton* 1027 (K); Mt. Kinabalu, Ulu Liwagu & Ulu Mesilan, alt. 1,800 & 1,300 m, *Chew, Corner & Stainton* 1417 & 1947 (K); Mt. Kinabalu, Minitindox Gorge, *Clemens* 10476 (K); Dallas, alt. 1,000 m, *Clemens* 26084 (K); Tenompok, alt. 1,700 m, *Clemens* 30028 (K); Penataran Basin, alt. 1,000 m, *Clemens* 34199 (type L); Tenompok, Kota Belud, alt. 1,600 m, *Meijer* 20325 (K); Kinabalu, Ranau, alt. 1,500–1,800 m, *Meijer & Corner* 22439 (K); Kundasan, alt. 1,500 m, *Sinclair* 8990 (K, L).

The Borneo material differs from the typical form of the species from Java in the much larger thyrses (20–25 cm long, 5–6 cm across) due to the more elongated main axis and extended peduncles of lateral cymes and cymules, and in the much larger fruiting calyx (1.2–1.5 cm long).

10. CYMARIA BENTH.

Cymaria Benth. in Bot. Reg. sub. *t.* 1292 (1829); in Benth. & Hook. f. Gen. Pl. 2 (1876) 1222; Briq. in E. & P. Pfl. Fam. 4, 3a (1897) 209.

Anthocoma Zoll. & Mor. in Nat. en Geneesk. Arch. Neerl. Ind. 2 (1845) 569.

Shrubs. Stems and branches 4-angled. Leaves opposite, petiolate. Flowers small, in lax, many-flowered, peduncled, dichotomously branched cymes; cymes usually axillary, sometimes the upper ones forming a terminal thyrsoïd inflorescence. Calyx campanulate (in fruit urceolate or subglobose), 10-nerved, the intermediate nerves weaker than the other 5, equally 5-toothed. Corolla-tube straight, exserted; limb 2-lipped; upper lip arched, erect; lower lip 3-lobed, spreading, the mid-lobe larger than the lateral. Stamens 4, ascending under the upper lip, in two pairs, the upper pair shorter; anthers 2-loculate, divaricate, the locules connivent, at length confluent. Disk equal, entire. Style 2-fid at the end, the upper branch very short. Nutlets subglobose or obovoid, subtriquetrous, rugose, the apex beset with white hairs; scar of contact surface very large, lateral.

Species about 3, from Burma, Thailand, Indo-China, S. China (Hainan) to Malesia. The following two species are found in Malesia.

Key to the species

- A. Leaves usually thin membranaceous, narrowly elliptic or narrowly ovate, peduncles subsessile or sometimes 0.5–1 cm long; flower-bearing branches extremely fine and slender, few (4–6) flowered; bracts often prominent; fruiting calyx subglobose.

1. *C. acuminata*

- A. Leaves usually membranaceous, ovate or rhomboid; peduncles 1–3 cm long, flower-bearing branches slender, usually 6–12 flowered; bracts minute, inconspicuous; fruiting calyx urn-shaped, normally crowned with erect teeth.

2. *C. dichotoma*

1. *Cymaria acuminata* Decne. in Nouv. Ann. Mus. Paris (Herb. Timor. Decne.) 3 (1834) 71; Deles. Ic. Pl. 3 (1837) *t.* 86; Benth. in DC. Prodr. 12 (1848) 602; Miq. Fl. Ind. Bat. 2 (1859) 992; Prain in Ann. Bot. 6 (1892) 215; Merr. Enum. Philip. Fl. Pl. 3 (1923) 408; Back. & Bakh. f. Fl. Java 2 (1965) 617.

Anthocoma flavescens Zoll. in Nat. en Geneesk. Arch. 2 (1846) 569; Hassk. Fl. 30 (1847) 596.

Gomphostemma dichotoma Zoll. et Mor. in Hassk. Flora 30 (1847) 596.

Cymaria mollis Miq. Fl. Ind. Bat. 2 (1859) 992.

Gomphostemma flavescens (Zoll.) Miq. Fl. Ind. Bat. 2 (1859) 987.

? *Cymaria timoriensis* Backer in Herb. Leiden.

A small shrub, 1 m high. Stems and branches 4-angled, finely pubescent when young, glabrescent at length. Leaves thin membranaceous, narrowly elliptic or narrowly ovate, 5–8 cm long, 3–4 cm wide, acuminate or sometimes acute, the base cuneate or attenuate, the margins serrate, finely hirsute on both surfaces; petioles 1–2 cm long, hirsute. Flowers 4–6 or more secundly arranged on the slender branches of axillary dichotomous cyme; main peduncles either subsessile, or sometimes 0.5–1 cm long, puberulent; flower-bearing branches 0.5–1.5 cm long, bracts prominent, bracteoles inconspicuous. Calyx campanulate, 1.5 (in fruit globose, 2.2) mm long, sparingly hirsute. Corolla 2 mm long. Nutlets ovoid, flattened, 1.5 mm long, 1 mm wide, the apex beset with short white hairs.

Type specimen: Timor, *Decne s.n.* (not seen).

Distribution: Endemic to Malesia (Java, Lesser Sunda Isls., Celebes, and the Philippines).

Ecology: In open thickets and secondary forests, usually at low altitudes.

Specimens examined:

Java: Madoera, 50 m, *Backer 20914* (L); Soerabaja, *Backer 36290* (L); Negoro Goenoeng, *Beume 1087* (L); Besoeki, alt. 100 m, *Buwalda 7277* (L); (fls. yellowish white); Mt. Semarang, *Horsfield s.n.* (K) (type specimen of *Cymaria mollis* Miq); Kediri, *Koorders 22758 & 22968* (L); Java, *Teysmann 1869* (L); Java, *Zollinger 3318* (L).

Lesser Sunda Islands: Babar Is. *Borssum 3020* (L) (stout herb, 0.5 m; fls. yellow); Tanimbar Is., *Borssum 3194* (L) (fls. whitish); Timor *Teysmann 11672* (L); Timor (?), *Zippelius s.n.* (L); Hort. Bogor (Cult.), Collector unknown (L).

Philippines: Luzon, *Cuming 446* (K, L); Mindanao, *Fenix 24966* (K); Mindanao, Zamboanga, *Hallier 636* (L); Luzon, Batangas, *Ramos 1833* (L, Sing.) & *22324* (K); Rizal, *Ramos 13587* (K, L); Sulu, Tawitawi, *Ramos & Edano 44048* (L, Sing.).

Celebes: S. E. Coast *Elbert 2958* (L); Salabosi, *Noerkas 385* (L); Laboeanpero, *Kjellberg 1279* (L).

This is probably an extremely variable species. The following specimens are notably deviated from the typical form of the species: *Zollinger 3318* and *Horsfield s.n.* (all from Java; the latter is the co-type of *Cymaria mollis* Miq.) possess very large leaves, up to 13 x 7.5 cm, and subsessile peduncles; *Teysmann 11672* (from Timor, which was identified as *Cymaria timoriensis* Backer, although this binomial has never been published) has extremely thick and densely tomentose leaves and multi-flowered verticillasters, more or less comparable to the type specimens of *Cymaria elongata* Benth. (*Wallich 2079*, from Taong Dong, Burma)

except the flowers are much smaller; *Hallier 636*, *Ramos & Edano 44048* (all from the Philippines) possess much thinner and narrower leaves and denser inflorescence. Their basic flower structures are similar.

2. *Cymaria dichotoma* Benth. in Wall. Cat. 2080 (1828), in Bot. Reg. sub. *t.* 1292 (1829), in Wall. Pl. As. Rar. 1 (1831) 64, Lab. Gen. & Sp. (1836) 705, in DC. Prodr. 12 (1848) 603; Miq. Fl. Ind. Bat. 2 (1859) 992; Hook. f. Fl. Brit. Ind. 4 (1885) 705; Prain in J. As. Soc. Beng. 66 (1899) 522, 74 (1907) 936; Ridl. Fl. Mal. Pen. 2 (1923) 654; Mukerj. in Rec. Bot. Surv. Ind. 14, 1 (1940) 227.

A shrub, 1 m high or slightly over. Stem and branches faintly 4-angled, finely pubescent. Leaves membranaceous, ovate or rhomboid, 5–11 cm long, 3.5–6 cm wide, acute or subacute, rarely acuminate, the base cuneate or attenuate, entire; margins elsewhere crenate or remotely dentate; glabrous above, appressed pubescent beneath; petioles 0.5–2 cm long, finely pubescent. Flowers small, 6–15 secundly arranged on the branches of cyme; main peduncles 1–3 cm long, finely pubescent; bracts under branches varying from ovate, spatulate to lanceolate, 3–5 mm long. Calyx campanulate, 1.5 mm (in fruit urceolate, 2.5 mm long, often crowned with the erect, lanceolate teeth) long, glandulate and pubescent; teeth 5, equal, triangular; pedicels short and slender, finely pubescent. Corolla 2.5 mm long, finely pubescent externally. Filaments ascending under the upper lip, included. Nutlets obovoid, 1.2 mm long, 0.6 mm wide, reticulate, the apex glandulate and beset with short hairs.

Type specimen: Burma, Taong Dong et Segain, *Wallich 2080* (K).

Distribution: Burma, Thailand to S. China (Hainan) and Malesia (Malay Peninsula, Philippines, Celebes and New Guinea).

Ecology: Often found on limestone hills, at low altitudes.

Specimens examined:

Malay Peninsula: Perak, Padang Rengas, *Burkill 13573* (Sing); Perak, Ipoh, *Curtis 3189 & 3320* (Sing); Perak, Kuala Kangsar, *Haniff 15996* (Sing); Perlis, Tebing Tinggi, *Henderson 23030* (Sing); Perak, Ipoh, *Fox 10686* (K, Sing); Perak, Ipoh, *Ridley 9734* (K, Sing); *Ridley 14297* (K, Sing); Kedah *Ridley 14927* (K, Sing); Perlis, Bt. Lagi, *Ridley 14929* (K, Sing); Perak, Ipoh, *Ridley s.n.* Jan. 1921 (K); Perak, *Scortechini s.n.* March 1894 (K, Sing).

Philippines: Philippines, *Micholitz s.n.* in 1884–84 (K).

Celebes: Moena Isls., alt. 0–125 m, *Elbert 2872 a & b* (L); Lozwoek, *Kaudern 498* (L).

New Guinea: Papau, Kanosia, alt. sea level, *Carr 11216* (K, L) (1.3 m, tall; fls. white, dorsal petal yellowish green).

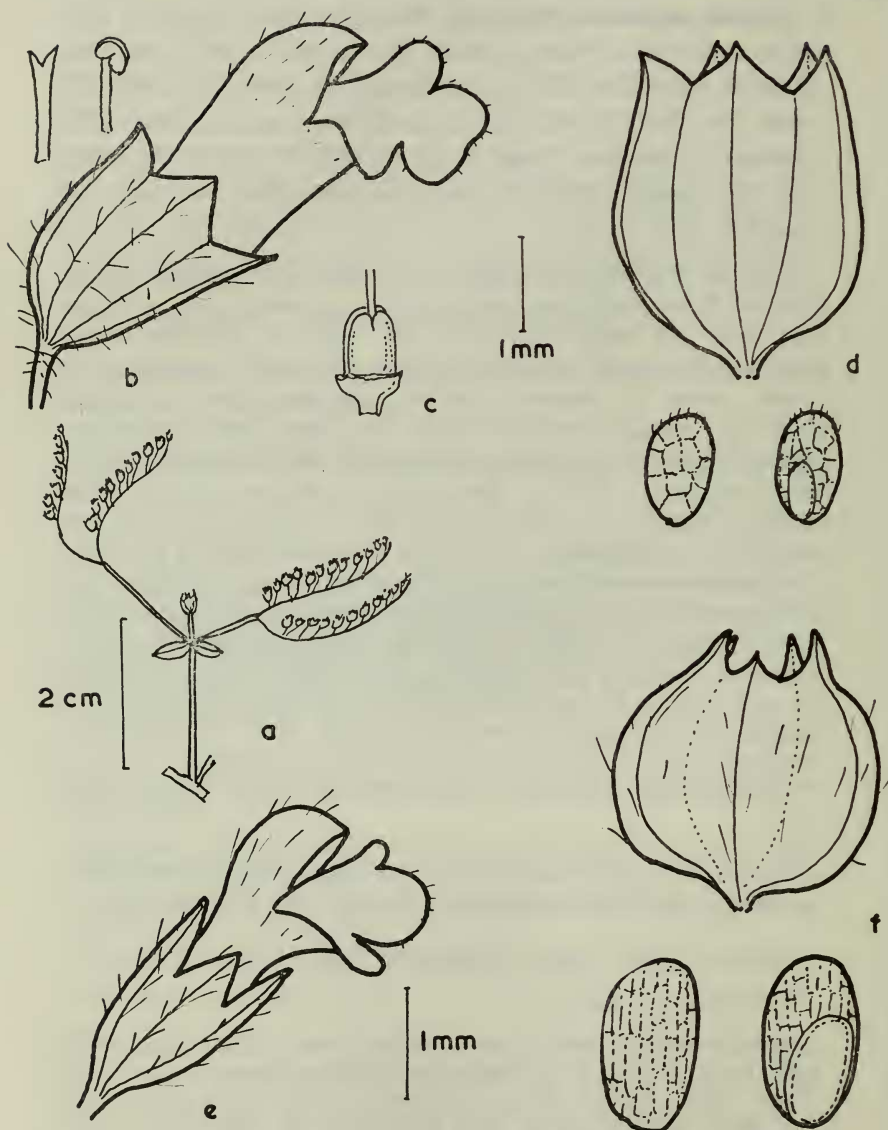


Fig. 10. *Cymaria dichotoma* Benth. (a-d) and *C. acuminata* Decne. (e. & f.).

a. diagram of cymose inflorescence; b. flower; c. ovary; d. fruiting calyx and nutlet (in 2 views); e. flower; f. fruiting calyx and nutlet (in 2 views) (a-d, Elbert 2872; e. & f. Backer 20914).

11. **DYSOPHYLLA** BL.

Dysophylla* Blume, Bijdr. (1826) 826; Benth. in Benth. & Hook. f. Gen. Pl. 2 (1876) 1180; Briq. in E. & P. Pfl. Fam. 4, 3a (1897) 330.

Erect herbs, usually pubescent. Leaves opposite, whorled, petio- late or sessile. False-whorls many-flowered, in densely spike-like inflorescence, terete; bracts minute, densely hairy. Calyx ovoid, 5-toothed, the teeth subequal, ciliate; throat naked within. Corolla minute, tubular, straight; tube exserted (in Malesian spp.); limb subequally 4-fid, 2-lobed, the upper lobe entire or notched, the lower spreading. Stamens 4, exserted, nearly straight; filaments beared; anthers 2-loculate, confluent. Disk equal, subentire. Style slender, 2-fid at the top. Nutlets ovoid or oblong, smooth or granulate.

Species about 15, all in S.E. Asiatic, mostly in India; only one species, *D. stellata* Benth., extended to Australia. 2 species and 1 variety are found in Malesia.

Key to the species and varieties

A. Leaves opposite; stems and branches very densely pilose.
1. *D. auriculata*

A. Leaves whorled (or spuriously so).

B. Leaves 4–10 in a whorl; stem and branches glabrescent or very sparingly hairy. 2. *D. stellata* var. *stellata*

B. Leaves 4 in a whorl; stem and branches tomentose or pubescent. 2a. *D. Stellata* var. *roxburgiana*

1. **Dysophylla auricularia** (Linn.) Bl. Bijdr. (1826) 826; Benth. Lab. Gen. & Sp. (1833) 158, in DC. Prodr. 12 (1848) 156; Hook. f. Fl. Brit. Ind. 4 (1885) 638; Prain, in J. As. Soc. Beng. 74, 2 (1907) 710; Merr. Enum. Philip. 3 (1923) 415; Ridl. Fl. Mal. Pen. 2 (1923) 648; Mansf. in Bot. Jahrb. 62 (1929) 378; Mukerj. in Rec. Bot. Surv. Ind. 14, 1 (1940) 79; Back. & Bakh. f. Fl. Java 2 (1965) 633.

Mentha auricularia Linn. Mant. 1 (1767) 81.

Mentha foetida Burm. f. Fl. Ind. (1768) 126.

Pogostemon auricularius (Linn.) Hassk. in Tijdsch Nat. Geschied 10 (1843) 127, Cat. Bog. (1858) 131; Miq. Fl. Ind. Bat. 2 (1859) 964.

*According to Dr. Bakhuizen van den Brink, Jr. (In Back. & Bakh. f. Fl. Java 2 (1965) 633), *Alopecuro-Veronica* Linn. Amoen. Acad. 4 (1759) 143, is the prior and legitimate name of the genus. Therefore, *Dysophylla* Bl. has either to be conserved or to be discarded. Although it is a rather small genus, I am in favour of conserving Blume's name, which is shorter and more meaningful. (See addendum on page 179).

11

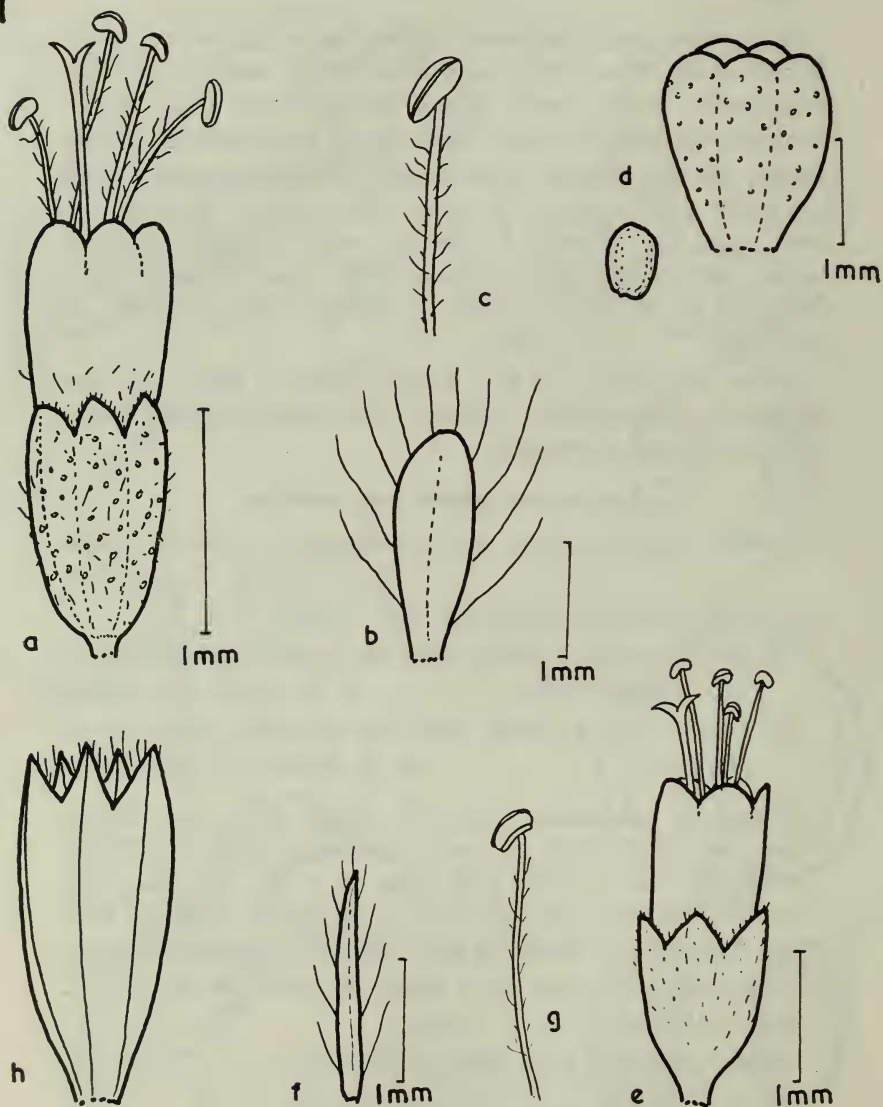


Fig. 11. *Dysophylla auriculata* Bl. (a-d) and *D. stellata* Benth. var. *roxburgiana* H. Keng (e-h).

a. flower; b. bract; c. stamen; d. fruiting calyx and nutlet; e. flower; f. bract; g. stamen; h. fruiting calyx. (a-d, *Houing* 7338; e-h, *Meijer* 6053).

An erect annual herb. Stems simple or laxly branched, 30–70 cm high, pubescent with spreading hairs. Leaves opposite, membranaceous, narrowly ovate to ovate, 4–6 cm long, 2–3 cm wide, acute or rarely obtuse, the base cuneate or rounded, entire; margins elsewhere irregularly serrate; pubescent on both surfaces; petioles 2–8 mm long, hairy. Flowers in dense, villous, terminal, cylindric spicate inflorescence, 4–7 cm long; false whorls of cymes close-set throughout; bracts narrowly elliptic, long ciliate. Calyx subcampanulate, gland-dotted, 1.2–1.5 mm long, 5-toothed, the teeth subequal, triangular; calyx in fruit urn-shaped, the teeth often incurved over the nutlets. Corolla 2–2.5 mm long; tube slender, exserted; lobes obtuse, pubescent. Filaments 3.5–4 mm long, slender, villous. Nutlets ellipsoid, 0.6 mm long and 0.4 mm wide, finely reticulate.

Distribution: Throughout Southeast Asia.

Ecology: A common weed, in open wet places at low and medium altitudes (often below 1,200 m).

Vernacular names: Koetjing-Koetjing (Sumatra); Ekor Kuching (Malaya); Kambing Kambing (Borneo).

Specimens examined:

Sumatra: Padang, *Beccari* 878 (K); Sumatra, *Bünnemeijer* 3277 (K); Sumatra, alt. 1,350 m, *Bünnemeijer* 5160 (K) ("Koetjing"); Lingga Arch., *Bünnemeijer* 6024 & 7148 (L); Lampong, *Iboet* 458 (K, L); Medan, *Lörzing* 12944 (L); Karo Highlands, *Lörzing* 14394 (L); Enggano, *Lütjeharms* 3830 (K, L, Sing.) & 5385 (L); Djambi, *Posthumus* 753 & 864 (L); Gajo, *Loeäs*, *Pringgo Atmodjo* 253 & 272 (L); Alas. Landen, *Pringgo Atmodjo* 406 (L); Poelo Liman, *Rahmat Si Boeea* 5334 (L); Asahan, Hoeta Tomoean Dolok *Rahmat Si Boeea* 8469 (L); Asahan, Tomoean Dolok, Alt. 1,000 m, *Rahmat Si Boeea* 9050 & 9929 (L); Asahan, Tor Matoetoeng, alt. 1,792 m, *Rahmat Si Boeea* 9442 (L); Berastagi, *Ridley* s.n. Feb. 1920 (K) (Type of *Dysophylla auricularia* var. *montana* Ridley); Korinchi, alt. 820 m, *Robinson & Kloss* s.n. May 1914 (K); Korinchi, alt. sea-level, *Robinson & Kloss* s.n. June 1914 (K); Palembang, *Steenis* 3348 (L).

Malaya Peninsula: Pahang, Bentong, *Best* 13871 (Sing.); Singapore, Queenstown, *Burkill* 1864 (Sing.) (fls. violet); Pahang, Gali Raub, *Burkill & Haniff* 16840 (Sing.) ("Ekor Kuching"); Pahang, *Evans* s.n. June 1917 (K); Singapore, *Furtado* s.n. April 1924 (Sing.) ("Tingo Toh Chau"); Negri Sembilan, Batang Malaka, *Fuyimoto* 3033 (Sing.); Malacca, Panchor, *Goodenough* 1265 (Sing.); Malacca, *Griffith* s.n. 1845 (K); Pahang, Chegar Perah, *Henderson* 19356 (Sing.); Johore, Bukit Poumong, Cha'ah, *Henderson* 38274 (Sing.); Singapore, *Hullett* 375 (Sing.); Johore, Kota Tinggi, *Kadim & Noor* 265 (Sing.); Johore, Kuala Kahang, *Lake & Kelsall* 4028 (Sing.); Kelantan, Kuala Limau Nipis, *Nur* 12163 (Sing.); Pahang, Katapang, *Ridley* 1286 (Sing.); Singapore, Jurong, *Ridley* s.n. 1890 (Sing.); Singapore, Ang Mo Kei, *Ridley* s.n. 1890 (Sing.); Singapore, Chua Chu Kang, *Ridley* s.n. 1894 (Sing.); Johore, Pulau Kukul, *Ridley* s.n. 1905 (Sing.); Selangor, *Ridley* s.n. July 1914 (K); Pahang, Kuala Tahan, *Seimund* 822 (Sing.); Johore, Kota Tinggi, *Teruya* 182 (Sing.); Singapore, Geylang, *Teruya* 2216 (Sing.); Malaya, *Walker* 64 (K); Penang, *Wallich* s.n. 1822 (K); Perak, Taiping, *Wray* 763 (K); Kelantan, *Yapp* 243 (K).

Java: Batavia, alt. 300 m, *Bakhuizen v/d Brink* 6559 (L); Bantam, *Buwalda* 2838 (L); Tjibodas, *Enoh* 100 (L); Ketenger, alt. 500 m, *Gaag* 116 (L); Buitenzorg, *Hallier* 285 b, c & e (L); Java, *Horsfield* s.n. (K); Batavia, *Kooders* 31409 (L); Djogdja, *Meijer* 2744 (L); Tjibodas, *Ooststroom* 13988 (L); G. Salak, alt. 1,200 m, *Raap* 168 (L); Batavia, *Schiffner* 2470 (K, L), 2475, 2490, 2499 & 2500 (L); Java, *Zollinger* 726 & 336 (K).

Borneo: N. Borneo, Pembliangam, *Amdjah* 810 (K, L); Sarawak, Bau, *Anderson* 47 (K, Sing.); N. Borneo, Jesselton, *Clemens* 9711 (K); Sarawak, Kapit, Upper Rejang, *J. & M.S. Clemens* 21060 K, L; Sarawak, Baraang, *Haviland s.n.* Nov. 1888 (Sing.); Sarawak, Niah, *Haviland & Hose* 3598 (K); Borneo *Korthals s.n.* (L); N. Borneo, Sandakan, *Leano* 5422 (K, Sing.) ("Kambing Kambing"); N. Borneo, Kinabatangan, *Maidin* 1748 (K); Borneo, Pontianak, *Mondih* 264 (K, L); Borneo, *Banjermasing, Motley* 423 (K); Sarawak, Sematan, *Purseglove & Shah* 1824 (K, L) (Herb 2 ft.; fls. lilac); Sarawak, Sungei Tau, *Purseglove* 5165 (L, Sing.); Anambas & Nautoena Isls., *Steenis* 786 (L); Borneo, Samarinda, *Winkler* 3128 (L); N. Borneo, Sandakan, *Wood* 786 (Sing.).

Philippines: Philippines, *Cuming* 1835 (K); Luzon, Sorsogon, *Elmer* 15671 (K); Culion Isl. *Merrill* 683 (K, Sing.); Palawan, Taytay, *Merrill* 1228 (Sing.); Luzon, Laguna, *Ramos* 12034 (K); Siargao Isl., *Ramos & Pascasio* 34971 (Sing.); Luzon, Camarines, Paracale, *Ramos & Edano* 33603 (Sing.); Bukidnon, Barrio Sumpung, alt. 650 m, *Santos* 6025 (L).

Celebes: Lombasang, alt. 950 m, *Bünnemeijer* 11112 (L); Malili, *Eyma* 3366 (L); Menado, Poso, *Eyma* 4050 (L); Kendari, *Kjellberg* 606 (L).

Moluccas: Ambon, *Kornassi* 1127 (K, L); Ceram, *Rutten* 1609 (L).

New Guinea: S.W. New Guinea, *Aët* 715 (L) (fls. blue); Japen, *Aët & Idjan* 752 (L); Kaiserin Augusta River, *Gjellerup* 352 (L); Koeria, *Janowski* 607 (L); Nr. Doorman River, *Lam* 1255 (L); Vogelkop Pen. *Schram* 6129 (L); Mamberamo, *Versteegh* 37 (L).

2. *Dysophylla stellata* (Lour.) Benth. in Wall. Pl. As. Rar. 1 (1830) 30, *descrip. excl.*, Lab. Gen. & Sp. (1833) 159, *descrip. excl.* in DC Prodr. 12 (1848) 158, *descript. excl.*

var. *stellata*.

Mentha stellata Lour. Fl. Cochinch. 2 (1790) 361.

Mentha verticillata (non L.) Roxb. Hort. Beng. (1814) 44, *nom. nud.* Fl. Ind. ed. 2, 3 (1832) 5.

Dysophylla verticillata (Roxb.) Benth. in Wall. Fl. As. Rar. 1 (1830) 30, in DC. Prodr. 12 (1848) 157; Hook. f. Fl. Brit. Ind. 4 (1885) 639; Prain in J. As. Soc. Beng. 74, 2 (1907) 876; Ridl. Fl. Mal. Pen. 2 (1923) 648; Merr. Enum. Philip. 3 (1923) 416; Mukerj. in Rec. Bot. Surv. Ind. 14 (1940) 81.

Pogostamon verticillatus (Roxb.) Miq. Fl. Ind. Bat. 2 (1859) 965.

Dysophylla benthamiana Hance in Ann. Sc. Nat. 5, Bot. 5 (1866) 234; Merr. in Trans. Amer. Phil. Soc. 24, 2 (1935) 342.

Annual (or sometimes perennial) herb, erect or climbing. Stems laxly or profusely branched, 10–100 cm high, glabrous or very sparsely hirsute. Leaves in whorls of 4–10, glabrous, linear, 3–7 (or more) cm long, 0.2–0.5 cm wide, acuminate, the base attenuate; margins entire or obscurely serrate; petioles very short or sessile. Flowers in villous, cylindric, terminal spicate inflorescence, 3–6 cm long; false whorls of cymes close-set throughout. Calyx campanulate, with soft, white hairs, 1–1.2 mm long; teeth subequal, triangular, spreading. Corolla tubular, about 2 mm long, the lobes pubescent. Filaments exserted, hairy. Nutlets ellipsoid, pale brown, minute.

Distribution: India to S. China and Japan, through Malesia to Australia.

Ecology: In open wet places, normally at low altitudes; in Celebes and New Guinea, however, it occurs from low to medium altitudes and reaches 1,500 m or even 2,000 m.

Specimens examined:

Sumatra: Kota Pulai, *Meijer* 6053 (L) (fls. pink).

Malay Peninsula: Kedah, Lankawi, *Cutis* 2098 (Sing.); Perak, *Deikum* 32 (Sing.) (fls. pink); Perlis, *Ridley* s.n. 1910 (Sing.).

Java: Bogor, *Teysmann* s.n. 1869 (L).

Philippines: Luzon, *Cuming* 1471 (K); Philippines, *Cuming* 1653 (K).

Celebes: Manado, alt. 700–1,300 m, *Bloebergen* 4173 (L); Tanette, alt. 450 m, *Bünnemeijer* 12545 (L); G. Bonthain, alt. 1,400 m, *Bünnemeijer* 12624 (K, L); Masamba, alt. 1,100 m, *Eyma* 1260 (L) (fls. lilac).

Moluccas: Halmahera, *Haan* 1791 (L) (fls. pale purple-blue); Morotai, *Main & Aden* 782 (L).

New Guinea: Papua, Vanapa Valley, alt. 1,900 m, *Brass* 4809 (K, L); Papua, Dagwa, Oriomo River, *Brass* 5917 (K); Papua, Lake Daviumbu, *Brass* 7820 (K, L) (fls. purple-pink); Papua, Koitaki, alt. 500 m, *Carr* 12670 (K); Papua, Milne Bay, alt. 1,000 m, *Cruttwell* 1220 (K); Morobe, Bulolo, alt. 1,000 m, *Havel* 7552 (L); Papua, North Dist., *Hoogland* 4219 (L); West Highland Dist., alt. 1,700 m, *Hoogland* 6230 (K, L); Hebar Valley, alt. 540 m, *Koster* 8022 (L) (fls. purple) & 8025 (L) (fls. lilac); Aiyura alt. 2,000 m, *McKee* 1258 (K, L); Morobe, *N.G.F.* 3265 (L); Aiyura, alt. 1,490 m, *Royen* 4455 (L).

Dysophylla verticillata (Roxb.) Benth. as Merrill (in Trans. Amer. Phil. Soc. 24, 2 (1935), p. 342) correctly pointed out, was based on an invalid basionym, *Menth verticillata* Roxb., and therefore should be abandoned. Although the descriptions and the citation of specimens of *Dysophylla stellata* (Lour.) Benth. as published in Wallich's *Plantae Asiaticae Rariores*, and in Benth. his later works, clearly refer to an entirely different Indian plant (of which the type specimens were collected by Heyne from Malabar and by Hamilton from Mysore), the binomial alone, should still be considered as a legitimate one.

To clear up this nomenclatural confusion*, the Southern Indian plant in question (types from Malabar and from Mysore) is here referred to Dalzell's valid binomial, *Dysophylla tomentosa*, with a citation of the important synonyms and literatures as follows:

Dysophylla tomentosa Dalz. in Hook. Kew J. 2 (1850) 337; Hook. f. Fl. Brit. Ind. 4 (1885) 641.

var. ***tomentosa***

Dysophylla stellata (Lour.) Benth. in Wall. Pl. As. Rar. 1 (1830) 30, *excl. type, pro descriptione*; Lab. Gen. et Sp. (1833) 159, *excl. type, pro descriptione*, in DC. Prodr. 12 (1848), 158, *excl. type, pro descriptione*;

For the clarification of nomenclature of these two species (*Dysophylla stellata* Benth. and *D. tomentosa* Dalz.), I am very grateful to Dr. Wm. T. Stearn, Mr. L. L. Forman, Dr. Bakhuizen van den Brink Jr. and Miss Jirayupin Chemsirivatna, for their helpful suggestions and discussions.

Dysophylla stellata Benth. var. *tomentosa* (Dalz.) Cooke, Fl. Bomb. 2 (1908) 458; Mukerj. in Rec. Bot. Surv. Ind. 14, 1 (1940) 80.

Dysophylla tomentosa Dalz. var. **gracilis** (Dalz.) *comb. nov.*

Dysophylla gracilis Dalz. in Hook. Kew J. 2 (1850) 337; Hook. f. Fl. Brit. Ind. 4 (1885) 641.

Dysophylla erecta Dalz. in l.c. 337; Hook. f. l.c. 641.

Dysophylla stellata Benth. var. *gracilis* (Dalz.) Cooke, Fl. Bomb. 2 (1908) 458; Gamble, Fl. Madras (1924) 1137; Mukerj. l.c. 81.

These two varieties are confined to the Deccan Peninsula, S. India.

2a. **Dysophylla stellata** (Roxb.) Benth. var. **roxburgiana** var. *nov.*

Dysophylla quadrifolia (Roxb.) Benth. in Wall. Pl. As. Rar. 1 (1830) 30, in DC. Prodr. 12 (1848) 157; Hook. f. Fl. Brit. Ind. 4 (1885) 639; Merr. Enum. Philip. 3 (1923) 415; Fl. Mal. Pen.; Mukerj. in Rec. Bot. Surv. Ind. 14, 1 (1940) 79.

Mentha quadrifolia Roxb. Hort. Beng. (1814) 44, *nom. nud.*, Fl. Ind. ed. 2, 3 (1832) 4 (*non* D. Don 1825).

Erect herb, perennial; stems simple or laxly branched, 30–50 or more cm high, tomentose throughout. Leaves always 4 in a node, membranaceous, linear or linear-lanceolate, 3–6 cm long, 0.3–0.7 cm wide, acute or acuminate, the base cuneate or decurrent; scattered pubescent on both surfaces; margins remotely serrate, or subentire; petioles 0.2–0.4 cm long, more commonly sessile. Flowers in dense cylindric terminal (sometimes also axillary) spicate inflorescence, 3–6 or more cm long; whorls of cymes very closely approximate; bracts linear lanceolate, long haired and ciliate; calyx obconical, 1.5–2 mm long, sparsely hirsute, the teeth equal, more or less erect, ciliate on the margins; corolla 2–2.5 mm long, shortly lobed; stamens barely exerted, villose. Nutlets broadly ellipsoid.

Distribution: S. & E. India, Burma to Malesia (Philippines, Celebes, and New Guinea).

Ecology: On or near wet places, altitudes 40–950 m.

Specimens examined:

Philippines: Davao, Mindanao, *Copland* 483 (L); N. Vizcaya Prov. Luzon, *Ramos* 8277 (L).

Celebes: Lomasang, W. Celebes, alt. 950 m, *Bünnemeyer* 10961 (L); Beao, alt. 300 m, *Kjellberg* 2230 (L).

New Guinea: Dagwa, W. Division, Papua, *Brass* 5917 (L); Kebar Valley, E. of Audjai, alt. 550 m, *Kalkman* 6403 (L); Kebar Valley, W. of Manokwari, *V. Royan* 3967 (K, L); S. New Guinea, *Wentholt* 255 (L) (lalang growth, flowers red-blue).

For the same reason as mentioned above, Bentham's *Dysophylla quadrifolia* is also based on an illegitimate name *Mentha quadrifolia* Roxb., and therefore should be abandoned. Besides, I do not think it is specifically different from *Dysophylla stellata* (Lour.) Benth.

12. **ELSHOLTZIA** WILLD.

Elsholtzia Willd. in Roem & Usteri, Mag. 6, 11 (1790) 3; Benth. in Benth. & Hook. f. Gen. Pl. 2 (1876) 1181; Briq. in E. & P. Pfl. Fam. 4, 3a (1897) 327.

Aphanochilus Benth. in Bot. Reg. sub. t. 1282 (1829).

Herbs or undershrubs. Leaves opposite, usually petiolate. False-whorls in spike-like or paniculate inflorescence, slender or stout, terete or secund; bracts linear to lanceolate, usually small (in Malesian species). Calyx ovoid or campanulate, 5-toothed, the teeth unequal. Corolla tubular, shortly exserted, straight or incurved; limb 4- or 5-lobed, obliquely 2-lipped, the upper lip erect, notched, the lower lip spreading, 3-lobed. Stamens 4, divergent or distant, often slightly unequal; anthers 2-loculate, the locules divaricate or at length confluent; filaments naked. Disk produced behind the ovary, oblique. Style subequally 2-fid with subulate lobes. Nutlets minute, ovoid, glandulate and pubescent (in Malesian species).

Species about 60, northern temperate and warm parts of the Old World; 3 species in Malesia.

Key to the species

- A. False-whorls consisting of fewer (2–12) flowers, apart, secund, in spike-like inflorescence; calyx 2 mm (in fruit 2.5–3 mm) long, the calyx tube gibbose, sparsely short-haired. 1. *E. blanda*
- A. False-whorls consisting of many (usually over 15) flowers, closely approximate, terete, in dense spike-like or paniculate inflorescence; calyx tubular, not gibbous.
 - B. Leaves elliptic or elliptic ovate, often covered with brownish yellow hairs beneath; inflorescence stout; calyx 4–4.5 (in fruit 6–6.5) mm. long, sparsely covered with curled yellowish hairs; bracts lanceolate. 2. *E. elata*
 - B. Leaves narrowly lanceolate, velutinous or sometimes glabrous beneath; inflorescence slender; calyx about 2 (in fruit 3–4) mm long; densely covered with long white hairs; bracts linear. 3. *E. pubescens*

1. **Elsholtzia blanda** (Benth.) Benth. Lab. Gen. & Sp. (1833) 162, in DC. Prodr. 12 (1848) 160; Hook. f. Fl. Brit. Ind. 4 (1885) 643.
Aphanochilus blanda Benth. in Wall. Pl. As. Rar. 1 (1830) 29, Bot. Mag. 58 (1831) t. 3091.

Herb, woody below, about 1 m tall. Stems often branched, puberulous or hoary. Leaves elliptic lanceolate, 3–5 cm long; 0.5–1 cm wide, acuminate, the base attenuate, narrowed into the petiole, the margins coarsely serrate, glabrous above, puberulous and dark glandulate on the lower surface; petioles 0.5 cm long. False whorls few-(2–12) flowered, closely apart, secund, in spike- or panicle-like inflorescence, 5–12 cm long; bracts lanceolate, 1–2.5 mm long.

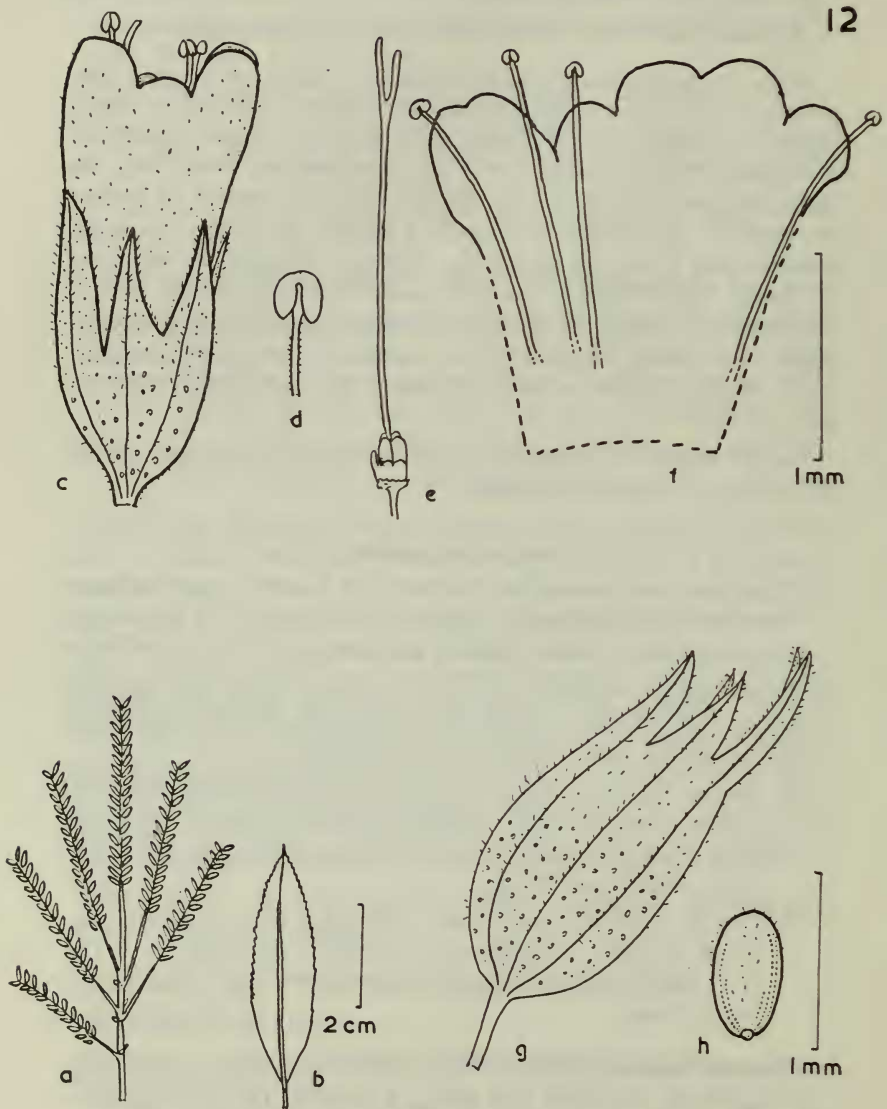


Fig. 12. *Elsholtzia blanda* Benth.

a. diagram of the inflorescence; b. leaf; c. flower; d. stamen; e. gynoecium and nectary disc; f. corolla expanded; g. fruiting calyx; h. nutlet (flower, Bünnenmeijer 5678; fruit, Läringer 6175).

Calyx urceolate, 1.5–2 mm (in fruit 2–3 mm) long, glandulate pubescent without, 5-toothed; mouth of fruiting calyx slightly contracted; teeth erect, lanceolate. Corolla campanulate, 2.5–3 mm long, 2-lipped, sparingly pubescent. Stamens in 2 pairs, subequal; filaments pubescent. Nutlets broadly ellipsoid, flattened, about 0.7 mm long.

Distribution: Himalayas to Burma and Malesia (Sumatra).

Ecology: In open places and forest edges at low to medium altitudes from 900 to 1,500 m.

Specimens examined:

Sumatra: Kabandjahe, alt. 1,225 m, *Bakhuizen v/d Brink* 6179 (L); Sumatra, *Beccari* 250 (K); Mt. Marapi, alt. 1,500 m, *Borssum Waalkes* 2114 (L) (undershrub, fls. green yellow); G. Singgalang, alt. 1,300 m, *Bünnemeijer* 2796 (L); G. Talang, alt. 1,350 m, *Bünnemeijer* 5101 (K, L); Bt. Gombak, alt. 1,350 m, *Bünnemeijer* 5678 (L); Dairi Lands, alt. 1,400 m, *Dames* 61 (L); Toba Lake, alt. 900 m, *Huitema* 42 (L); Karo Lands, alt. 1,350 m, *Lörzing* 5922 (L); Karo Lands, alt. 1,350–1,500 m, *Lörzing* 13804 (L); Piso-piso, alt. 1,400 m, *Lörzing* 15563 (L); Berastagi, *Nur* 7288 (K) (fls. white); Berastagi, *Ridley* s.n. Feb. 1921 (K) (fls. white); E. Sumatra, alt. 1,300 m, *Schiffner* 2469 (K, L).

2. *Elsholtzia elata* Zoll. & Mor. in Nat. Geneesk. Arch. N. I. (*Obs. Phyt.*) 2 (1845) 5; Benth. in DC. Prodr. 12 (1848) 161; Miq. Fl. Ind. Bat. (1859) 966.

Elsholtzia eriantha Benth. in Herb. Mus. Berol. mss., in DC. Prodr. 12 (1848) 161; Miq. Fl. Ind. Bat. 2 (1859) 966. *syn. nov.*

Shrubby, 2 m or more high, sparsely branched. Stems and branches slender, tomentose. Leaves thin membranaceous, elliptic to elliptic-ovate, scabrous or sparingly hirsute above, tomentose and glandulate beneath, 5–7 cm long, 3–3.5 cm wide, acute, the base attenuate, entire, the margins elsewhere serrate; petioles 0.5–0.8 cm long. Spurious spikes 7–10 cm long, solitary or forming paniculate inflorescence; false-whorls closely approximate, many (usually over 20-) flowered; bracts narrowly lanceolate or ovate, 3.5–4 mm long, pubescent and ciliate. Calyx tubular, 4–4.5 cm (in fruit 6–7.5 mm) long, appressed with soft curled hairs, the teeth subequal. Corolla 6–7 mm long, puberulent. Stamens puberulent, exserted. Style briefly 2-fid. Nutlets narrowly ellipsoid, about 12 mm long, 5 mm broad, yellowish brown, glandulate and pubescent.

Type: E. Java, *Zollinger* 2188 (K, L).

Distribution: Malesia (Java).

Specimens examined:

Java: E. Java, alt. 2,000 m, *Backer* 37644 (L); Ngadisari, alt. 2,000 m, *Koorders* 37620 & 37621 (L); Java, *Junghuhn* 55 (K); Tasari, *Ridley* s.n. Jan. 1915 (K); E. Java, *Zollinger* 2188 (K, L) (type).

The type locality of *Zollinger & Moritzi's Elsholtzia elata* is stated as "E. Java, in de bergstreken 3–9,000' germeen, in W. Java bij Tjipanas zeldzaam (Zoll.)". The only specimen available in the Leiden Herbarium is *Zollinger* no. 2188 (also from E. Java) which bears *Zollinger's* handwriting identified as *Elsholtzia elata*. It

happened to be the same collection number cited by Bentham (in DC. Prodr. v. 12, p. 161) as the type specimen of *Elsholtzia eriantha*. Therefore, I reduce the latter as synonymous with *Elsholtzia elata* Zoll. & Mor.

3. *Elsholtzia pubescens* Benth. Gen. Lab. & Sp. (1833) 162, in DC. Prodr. 12 (1848) 161; Miq. Fl. Ind. Bat. 2 (1859) 965; Back. & Bakh. f. Fl. Java 2 (1965) 632.

Elsholtzia mollissima Benth. Lab. Gen. & Sp. (1832–36) 163, in DC. Prodr. 12 (1848) 161.

Anisochilus euneurus Miq. Fl. Ind. Bat. 2 (1859) 957. *syn. nov.*

An erect herb, 1–2 m high. Stems and branches slender, densely tomentose. Leaves membranaceous, very narrowly elliptic to narrowly lanceolate, 6–8 cm long, 2.5–3 cm wide, acute or acuminate, the base acute or cuneate, the margins serrulate; pubescent above, velutinous or tomentose beneath; petioles 0.5–1.5 cm long. False whorls many- (20–30-) flowered, closely apart or widely apart or widely apart below, forming terminal spike-like or paniculate inflorescence; bracts linear to linear-lanceolate, 1.5–2 mm long, densely pubescent. Calyx tubular, narrowed on both ends, densely covered with long, white hairs, 2–2.5 mm (in fruit 4–4.5 mm) long, 5-toothed, the teeth unequal, sharply pointed. Corolla about 4 mm long; stamens 4, in 2 pairs, exserted; style briefly 2-fid. Nutlets narrowly ellipsoid, 1 mm long, 0.5 mm wide, puberulent and gland-dotted.

Type: Java, *Commerson s.n.* (P) (not seen).

Distribution: Malesia (Java, Lesser Sunda Isls., Celebes).

Specimens examined:

Java: G. Prabata, alt. 1,350 m, *Backer 15978* (L); Pekalongan, alt. 1,450–1,550 m, *Backer 16062* (L, Sing.); E. Java, *Coert 1173* (L); Java, alt. 1,300–1,400 m, *Elbert 142* (L); Java, *Horsfield 337* (BM, K, U) (Type of *Anisochilus euneurus* Miq.); Dieng, alt. 2,000 m, *Karsten 32* (L); G. Lawoe, alt. 1,300 m, *Karsten 43* (L); Besoeki, *Koorders 14822* (L); Semarang, *Koorders 27787* (K, L); Semarang, alt. 1,600 m, *Koorders 36055* (L); Besoeki, alt. 1,450 m, *Koorders 43191* (L) & *43193* (K, L); Pranten, *Docters Van Leeuwen 167* (L); Besoeki, alt. 1,700–3,000 m, *Neth. For. Ser. 5* (L); G. Lawoe, alt. 1,433 m, *Rant s.n.* 1922 (L); G. Welirang, alt. 2,000–2,800 m, *Steenis 7045* (L); Besoeki, alt. 1,600 & 1,800–2,400 m, *Steenis 10682* & *10908* (L, Sing.); G. Andjasmoro, alt. 1,900 m, *Winckel 34* (L).

Lesser Sunda Islands: Lombok, alt. 2,200–2,500 m, *Elbert 1024, 1057, 2327, 2337, 2374* & *2764* (L); E. Timor, alt. 2,400–2,950 m, *Steenis 18433* (L) (1–1.5 m, high; fls. white tinged pink, anther black); Lombok, G. Rindjani, alt. 2,000–3,000 m, *Tengwall 47* (L); Lombok, *Voogd 2079* (BM, K, L).

Celebes: Lombasang, alt. 950 & 1,100 m, *Bünnemeijer 11682* (Sing.) & *11817* (K, L); Mt. Bonthain, alt. 1,000 m, *Steenis 10393* (L).

Anisochilus euneurus Miq. is based on Horsfield's collection from G. Praoe, Java. The type specimen kept in the Utrecht Herbarium is identical with two other specimens kept in the Kew Herbarium and British Museum; the latter two specimens bear the collection number 337. They are indistinguishable from *Elsholtzia pubescens*.

13. **EURYSOLEN** **PRAIN**

Eurysolen Prain in Sc. Mem. Med. Offic. Ind. 11 (1898) 43; Kudo in Mem. Fac. Sc. & Agr. Taihoku Un. 2, 2 (1929) 275; Mukerj. in Rec. Bot. Surv. Ind. 14, 1 (1940) 226.

A herb or undershrub. Leaves opposite, petiolate. Flowers small, in many flowered false whorls condensed in terminal and axillary spicate inflorescences. Calyx tubular-campanulate, 10-nerved, 5-toothed, the teeth nearly equal, throat naked within. Corolla shortly exserted; tube annulate within, gibbous in front above the annulus; limb 2-lipped, the upper lip erect, slightly concave, retuse at the tip, the lower 3-lobed, spreading, the mid-lobe broader than the lateral ones. Stamens 4, in 2 pairs, the lower pair slightly longer; anthers ellipsoid, 2-loculate in bud, later confluent into 1-loculate; filaments puberulous with short hairs. Disk uniform. Style briefly 2-fid, the upper branch very short. Nutlets ovoid, subtriquetrous, papillose glandulate; scar of contact surface very large, lateral.

Monotypic, Burma, Thailand, Malesia (Sumatra, Java) to S. W. China (Yunnan).

1. **Eurysolen gracilis** Prain in Sc. Mem. Med. Offic. Ind. 11 (1898) 43, Ann. Roy. Bot. Gard. Calc. 9 (1906) 61, *pl.* 75; Kudo in Mem. Fac. Sc. & Agr. Taihoku Un. 2, 2 (1929) 276; Mukerj. in Rec. Bot. Surv. Ind. 14, 1 (1940) 227; Wu in Act. Phytotax. 8 (1959) 2.

Herb or undershrub, 30 cm to 1 m high. Stems and branches puberulous. Leaves membranaceous, ovate to rhomboid, 6–8 cm long, 2.5–4 cm wide, acute or acuminate, the base acute or alternate, entire; margins elsewhere serrate, glabrescent on both surfaces; petioles slender, 1.5–3 cm long. Flowers 6–10 in a false whorl, in terminal or upper-axillary spicate inflorescences, 8–15 cm long. Calyx tubular, 3–3.5 mm (in fruit 4–4.5 mm) long, sparsely puberulous and papillose-glandulate externally, 10-nerved, subequally 5-toothed, but hardly 2-lipped. Corolla tubular, 5–6.5 mm long; tube exserted, annulate within, slender and straight below the annulus, gibbous in front above the annulus; limb 2-lipped; upper lip short and erect, slightly concave and retuse at the tip; lower spreading, 3-lobed, the midlobe the largest. Stamens 4, in 2 pairs, the lower pair longer, all exserted; anthers ovate-reiniform, 1-loculate; filaments puberulous. Ovary very briefly stalked; style 2-fid. Nutlets ovoid (about 1 mm in immature specimens), papillose-glandulate, with a large scar on ventral surface.

Type specimen: Burma, Kachin Hills, *Prain's collector*, s.n. (K).

Distribution: Burma, Thailand to S. W. China (Yunnan) and Malesia (Sumatra, Java and The Lesser Sunda Islands).

Ecology: In ravines, mount trails or moist valleys at low to medium altitudes (700–1,800 m).

13

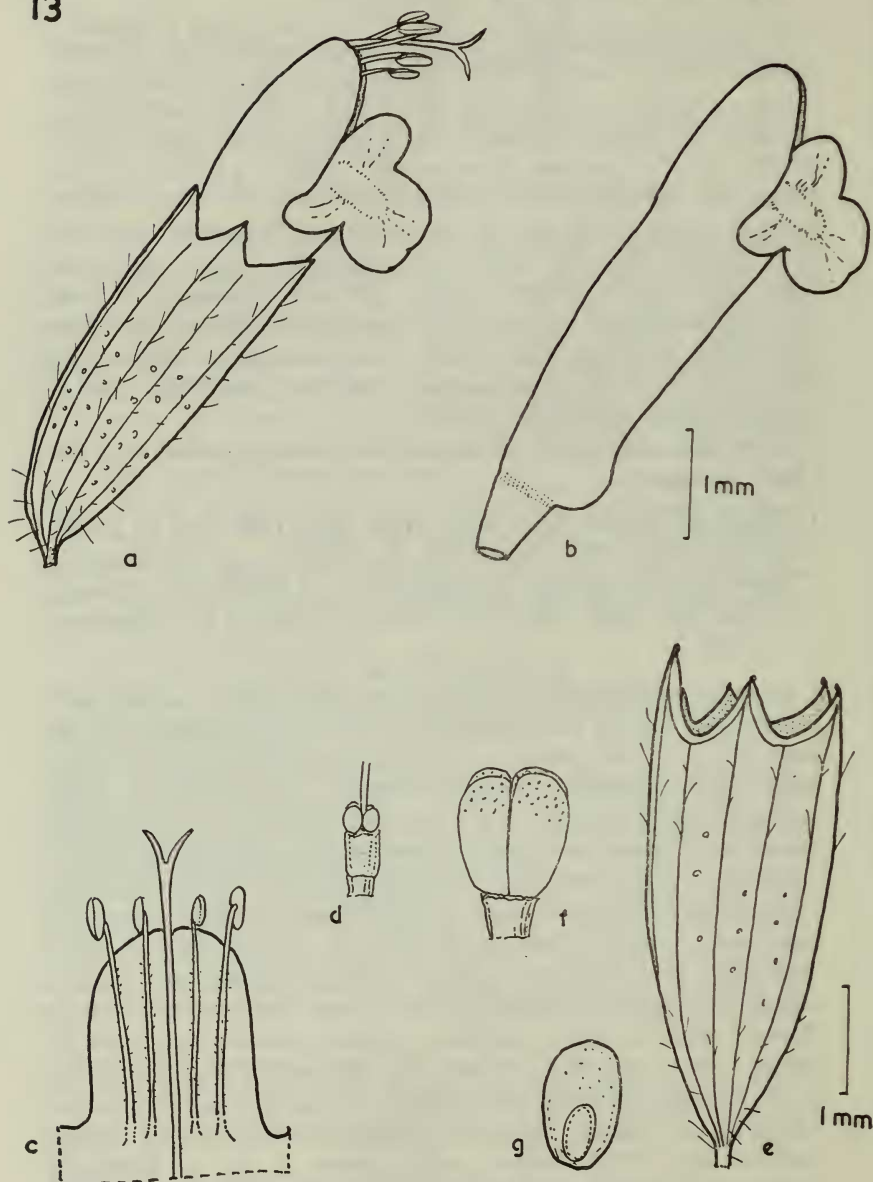


Fig. 13. *Eurysolen gracilis* Prain.

a. flower; b. corolla, showing the annulus and the gibbosity; c. portion of upper lip of corolla with stamens and style; d. ovary; e. fruiting calyx; f. 4 nutlets; g. nutlet, seen from ventral side, (flower, *Kostermans 18343*; fruit *Steenis 11118*).

Specimens examined:

Sumatra: Scolak Dras, Korinchi, alt. 1,000 m, *Robinson & Kloss s.n.* March 19, 1914, (BM, Sing); Sungei Kumbang, Korinchi, alt. 1,500 m, *Robinson & Kloss 130* (flowers white) (BM, K, Sing.).

Java: Besoeki, Jang Plateau East, Ravine of Djeloewang, alt. 1,800 m, *van Steenis 11118* (K, Sing.).

Lesser Sunda Islands: W. Soembawa, Balu lanteh, Mt. trail, from Baludulang to Pusu, alt. 700–800 m, *Kostermans 18343* (K) (herb, up to 1 m, fls. white, common from 900–1,100 m, in moist valleys on open places).

I am indebted to Miss Chirayupin Chermisrivathana who correctly identified *Robinson & Kloss 130* from Sumatra as belonging to this species. This led to the further discoveries of three more collections from the Malesian regions by myself. This monotypic genus was previously known only from Burma and S. W. China (Yunnan). Miss Chermisrivathana was also able to identify several collections from Thailand as referring to this species.

14. **GOMPHOSTEMMA** WALL. ex BENTH.

Gomphostemma Wall. ex Benth. in Wall. Pl. As. Rar. 2 (1831) 12; Benth. in Benth. & Hook. f. Gen. Pl. 2 (1876) 1216; Prain in Ann. Roy. Bot. Gard. Calc. 3 (1891) 242; Briq. in E. & P. Pfl. Fam. 4, 3a (1897) 223.

Perennial herbs or subshrubs, sometimes tuberous. Stems coarse, tomentose or stellately pubescent. Leaves opposite, large, mostly long-petiolate. Flowers medium or large, in few- to many-flowered false whorls, often forming densely sessile or laxly branched cymose inflorescence, rarely seemingly racemose; bracts ovate, lanceolate or linear. Calyx campanulate, 10-nerved, subequally 5-toothed. Corolla-tube slender, erect or incurved; throat narrow or inflated; limb 2-lipped, the upper lip galeate, entire or emarginate, the lower lip spreading, broadly, 3-lobed. Stamens 4, pubescent, all ascending, the lower pair longer; anthers connivent in pairs, each anther 4-loculate in bud, later 2-loculate, the locules transverse, parallel. Disk subequal or gibbous behind. Style very briefly 2-branched, the lobes subulate, the anterior one slightly longer. Nutlets drupaceous, glabrous or pubescent, the pericarp usually fleshy and white, with a broad hilum; only 1 or 2, rarely all 4 developed.

Species about 30, confined to South-eastern Asia, from E. India, Burma to S. W. China and Malesia.

Prain's scheme of classification of the genus into 3 sections, namely, *Stenostoma*, *Podosiphon*, and *Eugomphostemma*, is essentially based on the corolla characters. This has been employed as the basis for constructing the following key. Admittedly without flowering specimens, it is almost inapplicable. After examining a large number of herbarium specimens, two other features, namely the nature of the inflorescence and the shape and size of the calyx teeth, are considered useful in differentiating the Malesian species. 8 species are recognized and enumerated below.

Key to the species

- A. Corolla with almost straight tube and narrow throat, glabrous internally; nutlets usually 1 or 2 (§ *Stenostoma*).
 - B. Calyx teeth triangular or lanceolate, much shorter than the tube.
 - C. Flowers few in a verticil and forming axillary spurious racemes; calyx (in flower) 7–8 mm long, the teeth lanceolate. 1. *G. racemosum*
 - C. Flowers many in densely congested axillary verticils; calyx (in flower) 6–7 mm long, the teeth triangular. 2. *G. microcalyx*
 - B. Calyx teeth linear-subulate or narrow lanceolate, as long as or longer than the tube; flowers in lax, axillary, pedunculate often branched cymes.
 - C. Calyx teeth narrow lanceolate, nearly as long as the tube; plants generally covered with dark brownish tomentum. 3. *G. parviflorum*
 - C. Calyx teeth linear-subulate, considerably longer than the tube; plants generally covered with ash-grey tomentum. 4. *G. crinitum*
- A. Corolla with broad, distinctly incurved tube and inflated throat; nutlets usually 1–4.
 - B. Corolla-tube hirsute internally, and included in the calyx; lips small; nutlets usually 1–3 (§ *Podosiphon*). 5. *G. hemsleyanum*
 - B. Corolla-tube glabrous internally, and exceeding the calyx; lips large and prominent; nutlets usually 4 (§ *Eugomphostemma*)
 - C. Calyx-tube not ribbed; ovary glabrous or punctate; flowers in lax, pedunculate, branched cymes; stems ascending. 6. *G. curtisii*
 - C. Calyx-tube often conspicuously ribbed; ovary villous or hispid; flowers more or less congested in axillary verticils; stems erect.
 - D. Flowers about 10–15 in a verticil; bracts linear-lanceolate; calyx (in flower) 10–15 (–20) mm long; calyx-teeth generally shorter than the tube; corolla 40–45 (–50) mm long. 7. *G. javanicum*
 - D. Flowers about 20 in a verticil; bracts subulate; calyx (in flower) 18–25 mm long; calyx-teeth often considerably longer than the tube; corolla 45–60 mm long. 8. *G. scortechinii*

1. *Gomphostemma racemosum* van Steenis ex H. Keng.

Planta erecta, circiter 2 m alta; caulibus sulcatis; ramulis et foliis et inflorescentiis desissimo ferrugineo- vel aureo-hirsuto-velutinis; foliis chartaceis, ellipticis vel rotundato-ellipticis, 10–20 cm longis, 6–13 cm latis, apice acutis, basi lato-acutis, margine denticulato, supra velutino-pilosis ad costam, subtus dense ciliatis; petiolo 1–5 cm longo, dense velutini; verticillastris racemosis dispositis, axillaribus, pedunculis dense cinereo pubescentibus, 4–7

14

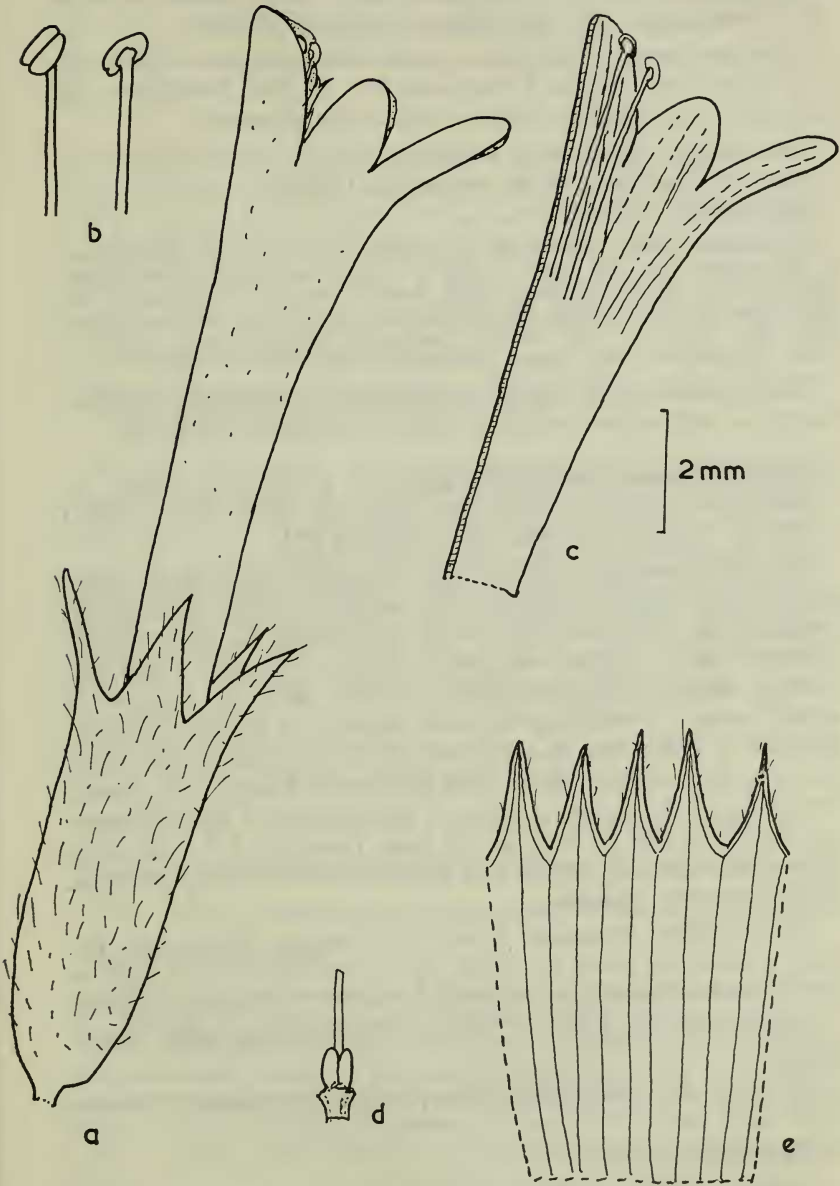


Fig. 14. *Gomphostemma racemosa* Steenis ex H. Keng.

a. flower; b. stamen (in 2 views); c. half corolla (upper portion) with stamens; d. ovary; e. calyx expanded, seen from inside. (Steenis 8684)

cm longis, rachibus usque 6 ad 7 cm longis; pedicellis subsessilis, bracteis parvissimis, linearis; calycibus 7–8 mm longis, costatis, extus dense pubescentibus, tubo cylindrico intus glabro, lobis lanceolatis, graciliter acuminatis, circiter 3 mm longis; corolla 18–20 mm longa, tubo plus minusve adpresse hirsuto.

Type specimen: N. Sumatra, Atjeh, Gajolanden, alt. 1,000 m. *Van Steenis 8684* (Type, L. duplicate Bo, K), Feb. 7 1937 (1–2 m tall, calyx hairy inside, corolla white, ovary glabrous).

Distribution: Endemic to Malesia.

Ecology: In forest, along stream, alt. 1,000 m.

Specimens examined:

N. Sumatra, Atjeh, Gajolanden, alt. 1,000 m, *Van Steenis 8684* (Type, L. duplicates, Bo, K), Feb. 7, 1937 (1–2 m. tall, calyx hairy inside, corolla white, ovary glabrous); Atjeh, bores Takengon, *Van Steenis 5815* (BO) Aug. 28, 1934; Atjeh, Gajolanden, alt. 1,050–1,150 m, *Van Steenis 9845* (BO) Mar. 19, 1937 (humid forest, fruit globular, with 1 kernel); Atjeh Gajolanden, Laut Tawar, *Jochime 237* (BO) Jan. 18, 1924.

This species can be readily recognized by the axillary spurious racemose inflorescence which is unique throughout the genus.

2. ***Gomphostemma microcalyx*** Prain in J. As. Soc. Beng. 59 (1890) 316, 74 (1907) 723, in Ann. Roy. Bot. Gard. Calc. 3 (1891) 251, pl. 84; Ridl. Fl. Mal. Pen. 2 (1923) 652.

A coarse perennial herb, 60–150 cm high, woody below. Stem stout, erect, hoary pubescent and scabrid. Leaves herbaceous, oblong-ovate, 12–15 cm long, 7–9 cm wide, acute, the base abruptly cuneate, entire; margins elsewhere entire or crenate or remotely toothed, finely stellate-pubescent on both surfaces; petioles of upper leaves 1–2 cm long, of lower leaves 4–5 cm long, scabrid. Flowers in dense, few-flowered whorls in the axils of the lower leaves and on the bare stem below the leaves; bracts ovate-lanceolate, entire, 6–7 mm long. Calyx 6–7 mm long; teeth short, triangular, less than half as long as the tube. Corolla 2.5–3.5 cm long, puberulent externally; throat very narrow. Style and ovary glabrous. Nutlets smooth, glabrous.

Type: Malay Peninsula; Perak, Ulu Bubong, *Kustler* (or *Dr. King's collector*) 10445 (K. type) 1886 (shrub, about 1 m high, in dense bamboo forest, alt. 150–200 m, flowers rich orange yellow).

Distribution: Endemic to Malesia (Sumatra and Malay Peninsula).

Ecology: In dense forests from lowland to medium altitudes (150–1,400 m).

Specimens examined:

Sumatra: Soengai Koeriman, alt. 1,000 m, *Bünnemeijer 3479* (L); Kerintji, alt. 1,100, 1,500 & 1,700 m, *Bünnemeijer 8228, 8414 & 8866* (BO); Kerintji alt. 1,400 m, *Jacobs 4546* (L); Sibolangit, alt. 400 m, *Lorzing 5769* (L); Bangunpurba, Serdang, alt. 300 m, *Lorzing 14646* (L); Djambi, alt. 200 m, *Posthumus 943 a* (BO, L); Asahan, Pargambiran, *Rahmat si Boeca 5738 & 5815* (L); Palembang, Ranaumeer, alt. 1,600, 550 & 500 m, *Steenis 3385, 3488 & 3776* (L); Asahan, *Yates 1738* (K).

Malay Peninsula: Perak, Larut, alt. 600–700 m, *Kustler 2155* (K); Perak, Ulu Bubong, alt. 150–200 m, *Kustler 10445* (K) (Type of *Gomphostemma microcalyx* Prain); Perak, Tapah, *Ridley 14061* (Sing.); Perak, Larut Hills, *Ridley s.n.* 1891 (Sing.); Malacca, *Ridley s.n.* (Sing.); Perak, Tapah, *Wray 835* (Sing.).

The collection number of the type specimen was erroneously given by Prain as *Kunstler 10455*. It should be *Kunstler 10445*.

This species, as pointed out by Prain, is nearest to *G. parviflorum* Wall. but with a much smaller calyx with diminutive teeth and a much narrower corolla. Their basic structures of inflorescences are also very different: verticils sessile, densely congested in *G. microcalyx*; verticils pedunculate, lax and often branched in *G. parviflorum*.

3. *Gomphostemma parviflorum* Wall. Cat. n. 2158/1 (*in parte*) Herb. Heyne (1828) et n. 2158/E (1859) *nom. nud.*; Benth. in Wall. Pl. As. Rar. 2 (1831) 12, (*in parte*); Hook. f. Fl. Brit. Ind. 4 (1885) 697 (*in parte*); Prain in Ann. Roy. Bot. Gard. Calc. 3 (1891) 252, pl. 86. Barker & Bakh. f. Fl. Java 2 (1965) 619.

Gomphostemma dichotomum Zoll. & Mor. Syst. Verz. (1846) 54; Miq. Fl. Ind. Bat. 2 (1856) 986.

Gomphostemma bartlettii Merr. in Pap. Mich. Acad. Sci. Art Let. 1933, 19 (1934) 191. *Syn. nov.*

A coarse, erect shrub, 2.5–3 m high. Stems stout, sulcate, densely covered with brownish stellate-tomentose. Leaves chartaceous, elliptic-ovate, 15–20 cm long, 6–10 cm wide, acute, the base attenuate, entire; margins elsewhere finely serrate, hirsute above, densely tomentose beneath; petioles 2–4 cm long, tomentose. Flowers in lax or condensed, many-flowered, axillary, pedunculate often branched cymes; bracts lanceolate to ovate, 1–1.5 cm long. Calyx 1–1.4 cm long, densely tomentose externally; teeth narrow lanceolate, nearly as long as the tube. Corolla 2–2.5 cm long, puberulent externally, the throat narrow. Style and ovary glabrous. Nutlets smooth, glabrous, 8 mm long, 3 mm broad.

Distribution: India, Burma to Malesia (Sumatra, Java).

Ecology: In moist and shaded rain forest, alt. 300–1,500 m.

Vern. names: Sarang banoea, Soeri-soeri, Kotok ring2 (Sumatra).

Specimens examined:

Sumatra: Between Panapparan & Pagar Batoe Habinsaran, *Bartlett 7935* (L) (Isotype of *Gomphostemma bartlettii* Merr.); Koerintji Peak, alt. 1,500 m, *Bunnemeijer 8414* (K, L); Asahan, Lower slope of Dolok si Manoek-manoek, *Rahmat si Boeea 9772* (L); Asahan, Aek si Tamberak, *Rahmat si Boeea 10644* (L); Toba, Loemban Loboe, *Rahmat si Boeea 10874* (L); Toba, Aek Rimau, *Rahmat si Boeea 11405* (L).

Java: *Zollinger 2028* (BM) (Type of *Gomphostemma dichotomum* Z. & M.)

Prain (l.c.) reduced *G. dichotomum* Z. & M. to a synonym of *G. parviflorum* Wall. An examination of the type specimen of the former justifies the reduction. I also consider the above-listed specimens from Sumatra, including the isotype of *G. bartlettii* Merr. as belonging to *G. parviflorum* Wall., a species formerly found in the Indo-Burma region.

4. **Gomphostemma crinitum** Wall. Cat. 2159/1 (1828) *nom. nud.*; Benth. in Wall. Pl. As. Rar. 2 (1831) 12, Lab. Gen. & Sp. (1835) 648, in DC. Prodr. 12 (1848) 552; Miq. Fl. Ind. Bat. 2 (1859) 987; Hook. f. Fl. Brit. Ind. 4 (1885) 695; Prain in Ann. Roy. Bot. Gard. Calc. 3 (1891) 254, *pl.* 88, in J. As. Soc. Bengal 74 (1907) 724 (incl. var. *griffithii*); Ridl. Fl. Mal. Pen. 2 (1923) 652.
- Gomphostemma parviflorum* (non Wall. ex Benth. 1831) Benth. Lab. Gen. & Sp. (1835) 648, in DC. Prodr. 12 (1848) 551; Miq. Fl. Ind. Bat. 2 (1859) 987.

A coarse perennial herb, 50–150 cm high. Stems stout, erect, sulcate, hoary-pubescent or scabrid. Leaves herbaceous, elliptic-ovate or oblanceolate, 25–30 cm long, 8–15 cm wide, acute, base cuneate, entire; margins elsewhere entire or remotely serrate, pubescent above, softly pubescent or tomentose beneath; petioles 2–5 cm long, scabrid. Flowers in lax or condensed, many-flowered axillary, often branched cymes; bracts linear, lanceolate or ovate-lanceolate, 1–2 cm long. Calyx 1.5–2 cm long, hispid-tomentose; teeth linear subulate, 0.9–1.3 cm long. Corolla 2.5–3.5 cm long, puberulent externally; the throat narrow. Style and ovary glabrous. Nutlets smooth, glabrous, 6 mm long, 3 mm broad.

Distribution: Burma (Tenasserim) Indo-China and Malesia (Malay Peninsula).

Ecology: Usually on limestone cliffs or at the base of limestone hills, altitudes 1,300–1,750 m.

Vern. name: Mungulon Bukit (Malay Peninsula).

Specimens examined:

Malay Peninsula: Perak, Tambun, *Burkill* 6298 (K, Sing.) (fls. dull yellow, on limestone cliff); Upper Perak, N. of Lawin, *Burkill* 12484 (Sing.); Perak, Grik, *Burkill & Haniff* 13783 (Sing.); Kedah, Kroh, alt. 130 m, *Corner* 38046 (K, Sing.); Perak, Ipoh, *Curtis* 3191 (Sing.); Pahang, Sungai Yu, *Foxworthy & Nur* 11922 (Sing.); Selangor, Ulu Selangor, Ulu Selangor, *Goodenough s.n.* Oct. 1899 (Sing.); Malacca, *Griffith* 4042 (K); Perak, Taiping, Batu Tegoh, *Henderson* 10058 (Sing.); Pahang, Tembeling, *Henderson* 21770 (BM, Sing.); Perak, Tanjong Rambutan, *Henderson* 23773 (Sing.); Pahang, Raub, Bukit Serdam, *Henderson* 25061 (Sing.); Negri Sembilan, Ulu Bendol, Bukit Linggung, *Holtum* 9836 (Sing.); Pahang, Kuala Tembeling, *Holtum* 20531 (Sing.); Selangor, Ginting Simpak, *Hume* 9263 (Sing.); Selangor, Ginting Bidai, *Kloss s.n.* (BM, K); Malacca, *Malvius* 2130 (Sing.); Trengganu, Ulu Brang, *Morsey & Kiah SFM* 33705 (Sing.); Pahang, Cameron Highlands, *Nur* 32572 (BM); Pahang, *Ridley* 2149 (BM, Sing.); Pahang, Kuala Tahan, *Ridley* 2185 (K, Sing.); Malacca, *Ridley s.n.* June 1892 (Sing.); Selangor, Ginting Neras, *Ridley* 7600 (Sing.); Selangor, *Ridley* 8564 (BM); Perak, Ipoh, *Ridley s.n.* Feb. 1904 (Sing.); Perak, *Ridley* 14298 (BM, K, Sing.); Perak, G. Kerbau, alt. 1,300–1,500 m, *Robinson s.n.* June 1913 (BM, K); Perak, Hulu Kavanse, *Scortechini* 928 (Sing.); Perak, Ipoh, *Sinclair* 9849 (K, Sing.) (on limestone rocks); Penang, *Wallich* 2159/1 (K); Penang, *Wallich s.n.* (K); Perak, Kota Kambong, *Wray* 3340 (Sing.); Upper Perak, alt. 100 m, *Wray* 3775 (Sing.).

5. ***Gomphostemma hemsleyanum*** Prain ex Collett & Hemsley in J. Linn. Soc. 28 (1890) 116; Prain in Ann. Roy. Bot. Gard. Calc. 3 (1891) 250, *pl.* 82, Backer & Bakh. f. Fl. Java 2 (1965) 619.

A perennial herb, about 60 cm high. Stems erect, woody, 4-angled, succate, densely tomentose. Leaves oblong to elliptic ovate, 6–12 (–18) cm long, 3.5–4.5 (–7) cm wide, acute, the base attenuate; margins crenate-serrulate, hispid above, densely greyish tomentose beneath; petioles 1–1.5 (–3) cm. long. Flowers numerous in axillary subglobular false whorls, the upper ones almost forming an interrupted spurious spike; bracts linear lanceolate, 6–12 mm long, 2–3 mm wide; calyx tubular-campanulate, 12–14 (in fruit 16–22) mm long; teeth broadly lanceolate, 7–9 mm long; corolla 8–10 mm long, incurved, hirsute internally below the throat. Nutlets 1–3, smooth, glabrous, ellipsoid, 4.5 (–6) mm long, 2.5 (–5) mm broad.

Distribution: upper Burma and Malesia (Java).

Ecology: in arid, sunny place, at low altitude.

Specimen examined:

Java: Near Asem Bagus, E. Java, alt. 150 m *Backer 8241* (BO), May 1913.

This interesting Burmese plant was collected only once by the late Dr. Backer. The specimen available is essentially a fruiting branch, with a few detached flowers contained in a folder. The general habit, and the inflorescences agree very well with the type of the species which is illustrated in Prain's monograph. The dimensions of the leaves and the flower parts, however, are much smaller in our plant than those in the typical form. The leaf-margin of our specimen is crenate-serrulate, instead of *argute* serrate, as described by Prain.

6. ***Gomphostemma curtisii*** Prain in J. As. Soc. Beng. 59 (1890) 315, 74 (1907) 75, in Ann. Roy. Bot. Gard. Calc. 3 (1891) 266, *pl.* 92; Ridl. Fl. Mal. Pen. 2 (1923) 654.

Cyrtandromoea repens Ridl. in J. Roy. As. Soc. Str. Br. no. 57 (1910) 74, Fl. Mal. Pen. 2 (1923) 543. *Syn. nov.*

A coarse perennial herb, 60–150 cm high. Stems flexuose, ascending, scabrid. Leaves herbaceous, ovate to oblong-ovate, or cordate, 8–12 cm long, 3–7 cm wide, acute, base very shortly cuneate; margins serrate or denticulate, sparsely hirsute above, adpressed tomentose beneath; petioles 3–12 cm long, tomentose. Flowers many in lax, axillary, branched cymes at the lower part of the stem; bracts oblong, 10–15 mm long, long-acuminate, entire or crisped. Calyx 12–14 mm long, smooth, glabrous within; teeth subulate-lanceolate, slightly larger than the tube. Corolla 25–35 mm long, distinctly recurved, puberulous externally. Style and ovary glabrous. Nutlets glabrous or punctate, oblong-ovoid, 6 mm long, 3 mm wide, apex rounded.

Type specimen: Malay Peninsula: Waterloo, Perak, alt. 650 m, *Curtis 1310* (K, Type; Sing. isotype), Dec. 1880.

Distribution: Endemic to Malesia (Sumatra, Malay Peninsula, Borneo).

Ecology: In dense mountain forest, from low to medium altitudes (250–1,300 m).

Specimens examined:

Sumatra: Berkoclen, Soeban Ajam, alt. 1,200 m, *Ajoeb 337* (B); Talamau, alt. 66 m, *Bunnemeijer 505* (B, L); Sibolangit, alt. 1,000 m, *Lorzing 4670* (L); Sibolangit, alt. 525 m, *Lorzing 5408* (L); Mt. Sibajak, alt. 1,000 m, *Lorzing 14079* (L); Pajakumbuh, Mt. Sago, alt. 800 m, *Meijer 4504* (L); East Coast, *Yates 895* (BM, K).

Malay Peninsula: Pahang, Cameron Highlands, *Batten Pool s.n.* Nov. 1939–Jan. 1940 (Sing.); Pahang, Pulau Tioman, *Burkill s.n.* June 1915 (Sing.); Pahang, Fraser Hill, alt. 1,300 m, *Corner 33178* (K, Sing.); Perak, Waterloo, *Curtis 1310* (K, Sing.) (Types); Waterloo, alt. 500 m, *Curtis 2156* (K, Sing.); Perak, G. Perak, *Haniff 10337* (Sing.); Pahang, Sungei Yel. Bukit Frasu, alt. 900 m, *Nur 11100* (Sing.); Pahang, Pulau Tioman, Bukit Bayoh, *Nur 18567* (K, Sing.); Pahang, Cameron Highlands, alt. 1,300 m, *Nur 32572 & 32839* (K, Sing.); Pahang, Telom, *Ridley 13593* (BM, Sing.); Perak, Temengoh, *Ridley 14446* (K, Sing.) (corolla white) (Type of *Cyrtandromoea repens* Ridley); Perak, Taiping, *Ridley s.n.* Feb.–Mar. 1892 (Sing.); Locality unknown, *Scortechini 924* (Sing.); Perak, G. Batu Puteh, *Wray 1233* (K, Sing.).

Borneo: Sarawak, Mt. Poi, *Clemens 20175* (K); Borneo, Bukit Mehigit, alt. 500 m, *Winkler 1113* (L).

The reduction of *Cyrtandromoea repens* Ridley (Gesneriaceae) as a synonym of this species was made by Mr. B. L. Burtt on an annotated sheet in the Kew Herbarium. A study of the type specimens, *Ridley 14446* (represented both at Kew and Singapore) confirms this reduction.

7. *Gomphostemma javanicum* (Bl.) Benth. Lab. Gen. & Sp. (1835) 650, in DC. Prodr. 12 (1848) 553; Miq. Fl. Ind. Bat. 2 (1859) 986; Prain in Ann. Roy. Bot. Gard. Calc. 3 (1891) 261; Backer & Bakh. f. Fl. Java 2 (1965) 618.

Prasium javanicum Bl. Bijdr. (1826) 840.

Prasium phlomoides Reinw. ex Bl. Bijdr. (1826) 840.

Gomphostemma oblongum Wall. ex Benth. in Wall. Pl. As. Rar. 2 (1830) 12, in DC. Prodr. 12 (1848) 551; Miq. Fl. Ind. Bat. 2 (1859) 986; Prain in Ann. Roy. Bot. Gard. Calc. 3 (1891) 261, pl. 95, in J. As. Soc. Beng. 74 (1907) 725; Ridl. Fl. Mal. Pen. 2 (1923) 653, f. 131. (incl. var. *setosa* Ridl.).

Gomphostemma phlomoides (Reinw. ex Bl.) Benth. Lab. Gen. & Sp. (1835) 649, in DC. Prodr. 12 (1848) 551; Miq. Fl. Ind. Bat. 2 (1859) 985.

Gomphostemma philippinarum Benth. in DC. Prodr. 12 (1848) 551; Prain in Ann. Roy. Bot. Gard. Calc. 3 (1891) 259, pl. 101; Merr. Enum. Philip. 3 (1923) 409.

Gomphostemma cinereum Elm. Leaf. Philip. Bot. 8 (1919) 3086.

Gomphostemma lacteum Ridl. in J. Bot. 62 (1924) 300. *syn. nov.*

A coarse perennial herb, 60–150 cm high. Stems erect, woody, 4-angled, densely tomentose. Leaves herbaceous, elliptic oblong, ovate or obovate, 15–30 cm long, 5–10 cm wide, acute, the base abruptly cuneate or subtruncate; margins crenate or crenate-serrate, hispid above, densely pubescent beneath; petioles 1–3 cm long, densely tomentose. Flowers 10–15 in dense, axillary false whorls; bracts ovate-lanceolate, 6–10 mm long, pedicels 4–7 mm long. Calyx 10–15 (–20) mm long, often very prominently ribbed, hirsute within; teeth lanceolate, acute or acuminate, generally shorter than the tube. Corolla 40–45 (–50) mm long, distinctly incurved, tomentose externally. Style sparingly hirsute when young, later glabrous; ovary villous. Nutlets 1–4, smooth, hispid at the apex, 6 mm long, 4 mm broad.

Type specimens: Java: Gunong Gede, *Blume s.n. (Herb. Lugd. Bat. 904, 354–154 & duplicates, nos. 97, 98, 101, 150 & 154)* (L, leptotype of *Prasium javanicum* Bl.).

Distribution: Endemic to Malesia.

Ecology: In forests from lowland to medium and higher altitudes (100–2,400 m).

Vern. names: Ata-Ata, Kagong, Kasunisuni, Magtingon (Philippines, fide Merrill).

Specimens examined:

Sumatra: Asahan, *Bartlett & La Rue 224* (L); Karo, Berastagi, *Bartlett 6527* (L); Singalang, alt. 1,500 & 2,300 m, *Bunnemeijer 2631 & 2747* (L); Malintang, alt. 1,100 m, *Bunnemeijer 3599* (L); G. Merapi, alt. 1,300, 1,500, 1,700, 1,150, 1,600, 1,600 & 1,140 m, *Bunnemeijer 4507* (BO); G. Koerintji, alt. 4744 (L), 4886 (BO), 4961 (BO), 4994 (BO) & 5032 (BO); G. Koerintji, alt. 1,300, 1,100, 1,500, 1,600, 1,700, 2,200, 1,800, 2,200 & 2,200 m, *Bunnemeijer 8230, 8518, 8557, 8688, 8868, 9205, 9299, 9889 & 10141* (BO); Sumatra, *Forbes 1579* (L); Hoedjoeng, *Forbes 1910* (BM, L); Sumatra, *Junghuhn s.n.* (L); Sumatra, *Koers 76* (BO); Sipora, *Kloss 14803* (K); Bandarbaroe, alt. 950 & 1,100 m, *Lorzing 4616* (L); & 4780 (BO, L), Karo, alt. 1,400 m, *Lorzing 5949* (BO, L); Sibolangit, Karo, alt. 1,350 m, *Lorzing 6178* (BO, L); Berastagi, alt. 1,350 m, *Lorzing 6765* (BO); Toba Highlands alt. 1,300 m, *Ouwehand 373* (BO); Korinchi, *Robinson & Kloss 4, 187 & 193* (BM); Atjeh, alt. 1,275 m, *Steenis 5908* (BO); Atjeh, alt. 1,000 m, *Steenis 8685* (BO, L); Palembang, G. Dempo, alt. 2,000 m, *Voogd 1551* (L).

Malay Peninsula: Selangor, Fraser's Hill, alt. 1,300–1,400 m, *Burkill & Holttum 8650* (K. Sing.); Pahang, Fraser's Hill, alt. 1,300 m, *Corner 33212* (K); Langkawi, G. Raya, *Haniff & Nur 7138* (K); Pahang, G. Senyum, *Henderson 22234* (Sing.); Kelantan, Bt. Batu Papan, *Henderson 29618* (K, Sing.); Kelantan, Gua Masang, *Henderson 29658* (K, Sing.); Pahang, Pine Tree Hill, alt. 1,600 m, *Nur 11075* (K, Sing.) (Types of *G. lacteum* Ridley); Pahang, Pulau Sawarwood, *Ridley 2148* (BM, K); Kota Glangii, *Ridley s.n.* Aug. 1891 (Sing.); Pahang, Tahan Valley, *Ridley s.n.* 1891 (Sing.); Selangor, 5th mile Pahang Track, *Ridley 8564* (K); Johore, Bt. Saya, *Ridley 11130* (K, Sing.); Pahang, Telom, *Ridley 13690* (Sing.); Pahang, *Ridley 13698* (BM); Perak, *Ridley 1406* (BM); Selangor, Semang Kok Pass, *Ridley s.n.* Jan. 1922 (K) (Type of *G. oblongum* var. *setosum* Ridley); Penang, Koh, *Robinson s.n.* May 1913 (K); Kedah Perak, alt. 500 m, *Robinson & Kloss 6144* (K); Pahang, Kuala Tahan, *Seimund 921* (Sing.).

Java: Pulasari, W. Bantam, alt. 750 m, *Adelbert* 460 (L); G. Malang, *Backer* s.n. Mar. 1909 (L); Preanger, alt. 1600 m, *Backer* 2430 (L); G. Gedeh, *Backer* 3304 (L); Wonosari, alt. 150–200 m, *Backer* s.n. 1912 (L); Soendih, alt. 150 m, *Backer* 6531 (L); G. Lawoe alt. 700 m, *Backer* 6731 (L); G. Salak, alt. 1200 m, *Backer* 9375 (L); G. Kendeng, alt. 1250 m, *Backer* 10976 (L); Moentilan, alt. 350 m, *Backer* 12052 (L); G. Lembang, alt. 1300 m, *Backer* 12217 (L); Java alt. 1900 m, *Backer* 21878 (L); Pema-lang, alt. 50 m, *Backer* 23351 (L); Tjidadap, alt. 1000 m, *Bakhuizen v/d Brink* 2189 & 2469 (L); Tjadas-Malang, alt. 1000 m, *Bakhuizen v/d Brink* 2968 (L); Tjidadap, alt. 900 m, *Bakhuizen v/d Brink* s.n. May 1917 (L); Tjidadap, *Bakhuizen v/d Brink* 3317 (L); G. Parang, alt. 650 m, *Bakhuizen v/d Brink* 22936 (L); G. Gede, *Blume* s.n. (L) (lectotype and type duplicates of *Prasium javanicum* Bl., Herb. Lugd. Bat. No. 904, 354–97, 98, 101, 150, 154); Besoeeki, *Buwalda* 7538 (L); Lembang, alt. 1850 m, *Coert* 1547 (L); S.E. Java, *Forbes* 623, 843, & 997 (BM, L); G. Gedeh, *Hallier* 392 (L); G. Gedeh, *Hallier* 478 (L); Buitenzorg, *Hallier* s.n. May 1895 (L); G. Tjibodas, *Hallier* s.n. June 1896 (L); Poeloosari, *Holstvoogd* 522 (L); Java, *Horsfield* s.n. (BM, L); Besoeeki, alt. 1700 m, *Koorders* 14853 (L); Tahoka, *Koorders* 15012 (L); Besoeeki, *Koorders* 20938 (L); Kediri, alt. 350–500 m, *Koorders* 22937 (L); Madioen, Ngebel, alt. 850 m, *Koorders* 23258 (L); Madioen, G. Wilis, alt. 1300 m, *Koorders* 23274 (L); Semarang, Kedoeng-Djati, *Koorders* 27205 (L); Ngebel, *Koorders* 29370 & 29833 (L); Ngebel, alt. 800 m, *Koorders* 29856 (L); Besoeeki, *Koorders* 30015 (L); Tjibodas, *Koorders* 31959 (L); Tjibodas, alt. 2400 m, *Koorders* 32022 (L); Pringombo, alt. 800 m, *Koorders* 33930 (L); Semarang, *Koorders* 36049 (L); G. Telemojo, alt. 1600 m, *Koorders* 35057 (L); Pasoeroean, *Koorders* 38195 (L); G. Papan-dajan, *Koorders* 40500 (L); G. Mandalagiri, alt. 1700 m, *Lam* 83 (L); Sendoro, *Lorzing* 741 (L); G. Wilis, alt. 1200 m, *Lorzing* 832 (L); G. Gedeh, *Lorzing* 2239 (L); Keruwang, *Monchy* 19 (L); Lembang, alt. 1500 m, *Pijl* 673 (L); Java, *Popta* 1301 (L); Kediri, *Rant* s.n. May 1924 (L); Magelang, *Rant* s.n. June 1928 (L); Java, *Reinwardt* s.n. (L) (lectotypes of *Prasium phlomioides* Bl.; Herb. Lugd. Bat. no. 909, 71–693; 909, 354–120); G. Gedeh, *Sapiin* 49 (L); G. Gedeh, *Sapiin* 285 (L); Tjidadap, alt. 1000 m, *Winkel* s.n. Dec. 1917 (L); Poelosari, *Wisse* 1011 (L).

Borneo: Tenompok, alt. 1,700 m, *Clemens* 26116 (L); Mt. Kinabalu, Penibukan, alt. 1300 m, *Clemens* 30655 (BM, L); Penataran Basin, alt. 1300 m, *Clemens* 34145 (BM, L); Mt. Kinabalu, *Clemens* 35013 (BM, L); W. Koetei, alt. 200 m, *Endert* 2891 (L); E. Borneo, Samarinda, *Kostermans* 6824 (L); Matang, *Ridley* s.n. July 1905 (K); Anambas & Natoena Isl. alt. 200 m, *Steenis* 950 (L).

Philippines: Luzon, Rizal, Bosboso, *Ahern's Collector* 1866 (K); Mt. Falinas, alt. 1500 m, *Butt* 328 (L); Bohol Isl., *Cuming* 1840 (BM, K) (type of *G. philippinense* Bth.); Negros, *Edano* 7145 (L); Leyte, Ormoc, Lake Danao, *Edano* 11894 (BM, L); Palawan, Malasgao, *Edano* 14077 (BM, L); Luzon, Mt. Pico de Loro, *Edano* 18024 (L); Luzon, Sorsogon, Mt. Bulusan, alt. 730 m, *Edano & Gutinez* s.n. May 1957 (L); Luzon, Benguet, Mt. St. Tomas, alt. 2000 m, *Elmer* 6534 (K); Luzon, Tayabas, *Elmer* 7435 (K); Mindanao, Davao, Todaya, *Elmer* 11146 (BM, K, L); Mindanao, Agusan, Mt. Urdaneta, *Elmer* 13469 (BM, L); Luzon, Irosin, *Elmer* 15290 (BM, K, L); Luzon, Los Banos, *Elmer* 17836 (BM, K, L) (type duplicate of *G. cinerea* Elm.); Luzon, Pampanga, Mt. Pinatubo, *Elmer* 22371 (BM, K, L); Luzon, Pangasinan, Mt. San Isidro, *Fenix* 29945 (BM, L); Basilan, *Hallier* 18 (L); G. Luzon, *Loher* 42 (K); Luzon, Benguet, *Loher* 4215 (K); C. Luzon, *Loher* 4232 (K); Luzon, Rizal, *Loher* 6594 (K); Luzon, Laguna, *Mabesa* 25009 (K); Luzon, Albay, Mayon Volcano, *Mendoza* 18370 (L); Luzon, Cavite, *Mendoza & Steiner* 41555 (L); Luzon, Lepanto, Mt. Data, *Merrill* 4563 (K); Mindanao, Camaguin, *Ramos* 14673 (BM, L); Luzon, Sorsogon, *Ramos* 23481 (L); Samar, Catubig River, *Ramos* 24403 (K); Luzon, Rizal, *Ramos & Edano* 29402 (K); Catanduanes, *Ramos* 30280 (K); Luzon, Kalinga, Mt. Masingit, *Ramos & Edano* 37494 (K); Luzon, Bontoc, Mt. Polis, *Ramos & Edano* 37617 (K); Mindanao, Bukidnon, Mt. Candoon, *Ramos & Edano* 38749 (K); Leyte, Cabalian, *Ramos* 41489 (L); Isl. Bohol, *Ramos* 43199 (BM, K); Basilan, *Reillo* 15411 (K); Luzon, Camarines, Maagnas, *Robinson* 6364 (L); Panay, Illoilo, *Robinson* 18189 (K); Luzon, Bontoc, *Vanoverbergh* 101 (L).

Celebes. Bonthain, *Teysmann* 13722 (L).

This is the commonest species found in the Malesian regions. Owing to the considerable variation in its tomentum, its leaf and floral characters, it has been described under several species names.

Based on the Javanese material alone, Backer and Bakhuizen van den Brink Jr. (1965) recognized two main forms: a. *javanicum* — corolla 3–5.25 cm long; narrow part of corolla-tube exceeding the calyx, 1.5–2 cm; calyx strongly ribbed; segments often abruptly acuminate; style glabrous or almost so; b. *phlomoides* (*G. phlomoides* Benth.) — corolla 2.5–3 cm long, narrow part of corolla-tube whether or not longer than the calyx, 0.75–1.25 cm; calyx not very strongly ribbed; segments acute or subacuminate; style at the top with many long hairs.

As the same authors correctly pointed out, these two forms are connected by a long series of intermediate forms. It is especially true when a large collection of materials from various geographical regions are examined. Therefore, I conclude that *G. javanicum* Benth. is a polymorphic species.

3. *Gomphostemma scortechinii* Prain in J. As. Soc. Beng. 59 (1890) 315, 74 (1907) 724, in Ann. Roy. Bot. Gard. Calc. 3 (1891) 260, *pl.* 93; Ridl. Fl. Mal. Pen. 2 (1923) 653.

A coarse perennial herb, 60–150 cm high, erect, woody below. Stems sulcate, scabrid. Leaves herbaceous, elliptic-oblong or obovate, 20–30 cm long, 10–15 cm wide, acute, the base long-cuneate; margins entire or remotely serrate, sparingly hirsute above, densely tomentose on the nerves beneath; petioles usually short, 0.5–1 cm long, sometimes obsolete. Flowers about 20 in dense axillary false whorls; bracts subulate, 6–8 mm long; pedicels 8–10 mm long. Calyx 18–25 mm long, prominently ribbed, hirsute within; teeth lanceolate, longer than the tube. Corolla 30–60 mm long, distinctly incurved, tomentose externally. Style hirsute towards the apex, with spreading hairs; ovary densely villous. Nutlets smooth, hispid towards the apex, 8 mm long, 5.5 mm broad.

Types: Malay Peninsula: Kedah, G. Tuyok, *Scortechinii* 1225 (K, Type; Sing. isotype) Sept. 1884.

Distribution: Burma (Tenasserim) and Malesia (Sumatra and Malay Peninsula).

Ecology: In forest, at low to medium altitudes (300–1,500 m).

Specimens examined:

Sumatra: West Coast, alt. 1500 m, *Bunnemeijer* 8414 (L); Indragiri, Pangian, *Buwalda* 6258 (BO, L); Atjeh, G. Goh Lemboeh, alt. 1000 m, *Steenis* 8927 (L) (Fl. leather yellow-orange).

Malaya: Pahang Bentong, Raub, *Best* 14117 (Sing.); Kedah, Langkawi, G. Raya, *Corner* s.n. Nov. 1941 (Sing.); Kedah, Langkawi, *Haniff & Nur* 7138 (Sing.); Selangor, Semenyih, *Hume* 7965 (Sing.); Kedah, *Kerr* 21706 (BM); Kedah, G. Tuyok, *Scortechinii* 1225 (K, Type; iso-type, Sing.); Pahang, Bentong, Sabai Estate, *Shah* 166 (K, L, Sing.); Selangor, Gua Batu Woods, *Ridley* 8221 (Sing.); Selangor, Batu Cave Woods, *Ridley* s.n. Dec. 1896 (Sing.); Kelantan, Channing Woods, *Ridley* s.n. Feb. 1917 (K).

The type locality of this species was cited by Prain as Gunong Tuyok, Kedah. Ridley (l.c., p. 653), suggested it is probably meant for *G. Hijau*, on the top of the Taiping hills in Perak.

15. **HYPTIS** JACQ.

Hyptis Jacq. Collect. 1 (1787) 101, 103, *nom. cons.*; Benth. in Benth. & Hook. f. Gen. Pl. 2 (1876) 1178; Briq. in E. & P. Pfl. Fam. 4, 3a (1897) 333.

Mesosphaerum R. Br. Hist. Jamaica (1756) 257.

Herbaceous or shrubby, often aromatic. Leaves opposite, serrate. Flowers small or medium, variously arranged in densely spicate or densely capitate inflorescences or in few-flowered clusters, often secund; bracts subulate or setaceous. Calyx tubular, straight or oblique, 10-nerved; teeth 5, subequal, acute or awned, erect. Corolla 5-lobed, 2-lipped; upper lip 2-lobed, the lobes erect or spreading or reflexed; lower lip 3-lobed, the mid-lobe abruptly deflexed, with thickened margins, sometimes saccate at the base. Siamens 4, declinate; filaments free, without basal appendages; anther-locules confluent. Disk entire. Style subentire or shortly 2-fid. Nutlets oblong or ovoid, smooth or rugose sometimes only one or two developed.

Species over 350, all American; the following 5 species are more or less established in the Old tropical regions as weeds.

Key to the species

- A. Flowers in numerous flowered verticillasters, congested into globose or ellipsoid spurious heads (or dense-spikes).
 - B. Spurious heads axillary, globose or subglobose.
 - C. Spurious heads 0.8–1.2 cm (in fruit) across; peduncles usually not longer than the heads. 1. *H. brevipes*
 - C. Spurious heads 1.5–2 cm (in fruit) across; peduncles several times as long as the heads. 2. *H. rhomboidea*
 - B. Spurious heads (or dense spikes) terminal; oblong or ellipsoid, 3–5 cm (in fruit) long. 3. *H. spicigera*
- A. Flowers in few-flowered cymose clusters, axillary or in terminal spurious racemes or panicles.
 - B. Cymes 6–15-flowered, comb-shaped in terminal spurious racemes or panicles; calyx tubular, 3–4 mm long in fruit. 4. *H. pectinata*
 - B. Cymes 2–5-flowered, clustered in leaf-axils or racemosely disposed; calyx obliquely campanulate, 8–10 mm long in fruit. 5. *H. suaveolens*

1. **Hyptis brevipes** Poit. in Ann. Mus. Paris 7 (1806) 465; Benth. Lab. Gen. Sp. (1833) 105, in DC. Prodr. 12 (1848) 107; Miq. Fl. Ind. Bat. 2 (1858) 959; Hook. f. Fl. Brit. Ind. 4 (1885) 630; Prain in J. As. Soc. Beng. 74, 2 (1907) 704; Merr. Enum. Philip. 3 (1923) 416; Ridl. Fl. Mal. Pen. 2 (1923) 645; Kudo in Mem. Fac. Sc. Ag. Taihoku Un. 2, 2 (1929) 147; Mukerj. Rec. Surv. Ind. 14, 1 (1940) 62; Back. & Bakh. f. Fl. Java 2 (1965) 634.
Thymus biserratus Blanco Fl. Filip. (1837) 478.

Pycnanthemum subulatum Blanco l.c. ed. 2 (1845) 333, ed. 3, 2 (1878) 251, t. 204.

Leucas globuligera Hassk. Cat. Bog. (1844) 133; Miq. Fl. Ind. Bat. (1859) 984. *syn. nov.*

Hyptis brevipes Poit. var. *serrata* Briq. in Ann. Cons. Jard. Bot. Geneve 2 (1898) 227.

An erect herb, 0.5–1 m high. Stems shortly branched, glabrous or pilose. Leaves membranaceous, narrowly lanceolate or ovate-oblong, 4–8 cm long, 1–2.5 cm wide, acute or acuminate, the base long cuneate, entire; margins elsewhere serrate, sparsely hispid on nerves on both surfaces; petioles 0.5–1 cm long, hispid. Flowers in dense spurious heads, 0.6–0.8 cm (0.8–1.2 cm in fruit) in diameter, on axillary, hispid slender peduncles, 1–1.2 cm long; subtending bracts lanceolate or subulate, 4–6 mm long, setaceous. Calyx sub-tubular, 2.5–3 mm (in fruit 3–4 mm) long; teeth erect, subulate, 1–1.4 mm long, sparsely ciliate. Nutlets ovoid, 0.7 mm long, dark brown, minutely rugose.

Distribution: A native of tropical America, now naturalized in tropical Asia and tropical Africa.

Distribution: A pantropic weed, native of Mexico.

Ecology: In open waste places of the lowland.

Vern. names: Ane-Ane (Sumatra), Koempai-hoeloeman (C. E. Borneo), Djoekoel pendoel (Java).

Specimens examined:

Sumatra: Loeboeksikaping, alt. 450 m, *Bunnemeijer* 1225 (L); Bangka, alt. 60 m, *Bunnemeijer* 1645 (L); Coast Koerintji, Koemantan, alt. 850 m, *Bunnemeijer* 8124 (L); P. Siberoet, *Iboet* 191 (L); Lampong, alt. 200 m, *Iboet* 320 (L); Medan, alt. 15–20 m, *Lorzing* 12888 (L); Bangko, Djambi, alt. 60 m, *Posthumus* 511 (L); Karbouwengat, *Stomps* s.n. Sept. 1923 (L); Palembang, Sekajoe, alt. 15 m, *Thorenaar* 150 (L); Laboehan, Kota Pinang, *Toroes* 3651 (L); Tapianoeli, Padang Si Dempoean, Pandang Lawas, *Toroes* 5069 (L); Seengie Pantjoer, *Wyssling* s.n. 1932 (L).

Malay Peninsula: Singapore, *Anderson* 144 (K); Johore, Kg. Slantai, alt. 1.4 m, *Burkill & Shah* 2495 (K, L); Malacca, *Griffith* 3961 (K); Malacca, alt. 7 m, *Shah* 16 (K, L); Singapore, Lim Chu Kang, *Sinclair* s.n. Jan. 1951 (L); Johore, *Spare* 783 (K); Kedak, *Spare* 3739 (K).

Java: Batavia, *Backer* s.n. 1902 (L); Poerwakarta, alt. 75 m, *Backer* 89 (L); Tanah Biureum, *Backer* 6023 (L); Pasoeroean, Djatiroto, alt. 15 m, *Backer* 7829 (L); Djasinga, alt. 250 m, *Backer* 10046 (L); Nirmala-tji Langgar, alt. 900 m, *Backer* 11114 (L); Tjitjoeroeg Djampang, alt. 200–250 m, *Backer* 17222 (L); Djember alt. 80–125 m, *Backer* 17709 (L); Poeger, alt. 25 m, *Backer* 18267 (L); Preanger, Tjikidang, alt. 600 m, *Bakhuizen v/d Brink* 113 (L); Tjidadap, alt. 1000 m, *Bakhuizen v/d Brink* 2557 (L); Batavia, Wanajasa, alt. 600 m, *Bakhuizen v/d Brink* 4837 (L); Buitenzorg, Soekasari, *Burck* s.n. (L); Bantam, alt. 125 m, *Buwalda* 2831 (L); Buitenzorg, *Hallier* 281b, d & 282a (L); (several collections); Semarang, Koedoes, *Houwing* 14 (L); Semarang, alt. 15–20 m, *Houwing* s.n. 1925 (L); Banjosmas, Serajoe, *Kievits* *Banj.* 39 (L); Banjoemas, *Kievits* 2312 & 2481 (L); Banjoemas, alt. 15–20 m, *Kievits* s.n. 1924 (L); Java, *Kobus* 7342 (L); Banjoemas, Pringombo, *Koorders* 27119 β (L); Pekalongan, *Koorders* 27451 β (L); Buitenzorg, Depok, *Koorders* 31303 β (L); Batavia, Tjiampea, alt. 150 m, *Koorders* 31475 β (L); Bogor, *Korthals* s.n. (L); Java, *Korthals* s.n. (L); Pakisan, *Kulescha* 32 (L); Bogor, Djabaru, alt. 260 m, *Nedi & Idjan* 137 (L); Java, alt. 700 m, *Popta* 225/66 (L); Buitenzorg, alt. 250 m, *Reap* 15 (L); Batavia, Tjiliwong, alt. 250 m, *Schiffner* 2471 (L); Batavia, Tjiliwong, alt. 240 m, *Schiffner* 2494 (L); Buitenzorg, Horto Botanico, alt. 260 m, *Schiffner* 2502 (L); Bogor, *Teysmann* 107 (L); Tjidadap, alt. 3000 m, *Winckel* 789 (L); Preanger, Tjadas Malang, alt. 1,000 m, *Winkel* s.n. & 1355 (L).

Lesser Sunda Islands: Lombok, alt. null to 50 m, *Elbert* 2379 (L); Flores, alt. 1000–1200 m, *Elbert* 4314 (L).

Borneo: British North Borneo, *Agama* 466 (L); Mt. Kinabalu, Tenom-pok, alt. 1333 m, *Clemens* 30069 (L); Sandakan, *Elmer* 20158 (L); W. Koetai, *Ender* 2179 (L); Borneo, *Korthals* s.n. (L); Sarawak, Kampong Push, Sematan, alt. 17 m, *Purseglove & Shah* 4641 (L); Samarinda, *Roos* s.n. 1941 (L).

Philippines: Batangas, Mataasnakahoy, *Araney* 21 (L); Luzon, Sorso-gon, Irosin, Mt. Bulusan, *Elmer* 17787 (L); Mindanao, Bukidnon, Tanau-lan, *Fenix* 26118 (L); Quezon, Bagong-bantay, *Manayon* 43 (L); Batangas, *Merrill* 478 (L); Luzon, Bataan, Lamao River, Mt. Mariveles, *Merrill* 3270 (L); Sto. Domingo, *Mundo* 17 (L); Mindanao, Cotabato, *Robinson* 11583 (L); Cotabato, Ala Valley, *Santos* 4813 (L); Bukidnon, Maragam, alt. 700 m, *Santos* 4995 (L); Iba Zambales, Barrio Amungan, Sitio Apulul, *Santos* 6107 (L); Iloilo, Sara, Mason son, *Soriano* 1252 (L).

Celebes: Malino, alt. 280 m, *Bunnemeijer* 10716 (L); Manado, Poso, *Eyma* 4051 (L); Manado, *Forsten* 84 (L); Manado, *Forsten* 69 (L); Tondano, *Forsten* s.n. May 1840 (L); Kendari, *Kjillberg* 373a (L); Minahassa, Menado, alt. *Koorders* 17381 β (L); Macassar, *Robinson* 2457 (L).

Moluccas: Ternate, alt. 2 m, *Beguín* 1052 (L); Ambon, alt. null M. *Kornasei* 1093 (L); Amboina, *Zippelius* s.n. (L).

New Guinea: Sepik, Wewak-Angoram Area, alt. 27 m, *Pullen* 1793 (L); Mamberamo, Pioneerbivouack, *Versteegh* 41 (L).

Leucas globuligera Hassk. is represented by the following spec-imen at Leiden Herbarium: *Herb. Lugd.*—*Bat.* 904, 356–446, which has been correctly identified by H. Hallier as *Hyptis brevipes* Poit. 2. *Hyptis rhomboidea* Mart. & Gal. in Bull. Acad. Bru. 11, 2 (1844) 188; Epling in Kew Bull 1936 (1936) 278.

Hyptis capitata (non Jacq.) Miq. Fl. Ind. Bat. 2 (1858) 958; F.-Vill. Novis App. (1880) 164; Merr. Enum. Philip. Fl. Pl. 3 (1923) 416; Kudo in Mem. Fac. Sc. & Ag. Taihoku Un. 2, 2 (1929) 147; Mukerj. in Rec. Bot. Surv. Ind. 14, 1 (1940) 63; Back. & Bakh. f. Fl. Java 2 (1965) 634.

Hyptis decurrens (Blanco) Epling in Fedde, Pepert. 34 (1933) 120.

Pycnanthemum decurrens Blanco, Fl. Filip. ed. 2 (1845) 333, ed. 3, 2 (1878) 251, t. 294.

Hyptis celebica Zipp. ex. Koord. in Meded.'s Lands Plantent. 19 (1898) 561. *syn. nov.*

Hyptis lanceolata (non Poit.) Briq. in Ann. Cons. Jard. Bot. Geneve 2 (1898) 225 (quoad *Cuming* 591).

A stout, erect annual herb, 0.5–1.5 m high; non aromatic. Stems and branches (often very short) densely or sparsely pubescent on the angles. Leaves lanceolate or rhomboid-elliptic, 6–10 (–14) cm long, 1.5–4 (–6) cm wide, acute or acuminate, the base cuneate and decurrent; margins crenate-serrate or serrate, sparsely pubescent on the nerves of lower surfaces; petioles 2–3 cm long. Flowers numerous in verticils crowded forming axillary, solitary globulate heads, 0.8–1 cm (1.5–2 cm in fruit) in diameter; peduncles 3–5 (–8) cm long; basal involucre bracts linear-lanceolate, hairy, 3–6 mm long. Calyx 3–4 mm (6–8 mm in fruit) long; teeth subulate, erect, as long as or shorter than the tube. Corolla 5–6 mm long. Nutlets ovoid, compressed 1.2–2 mm long, round-truncate above, subtriquetrous below, sparingly puberulent.

15

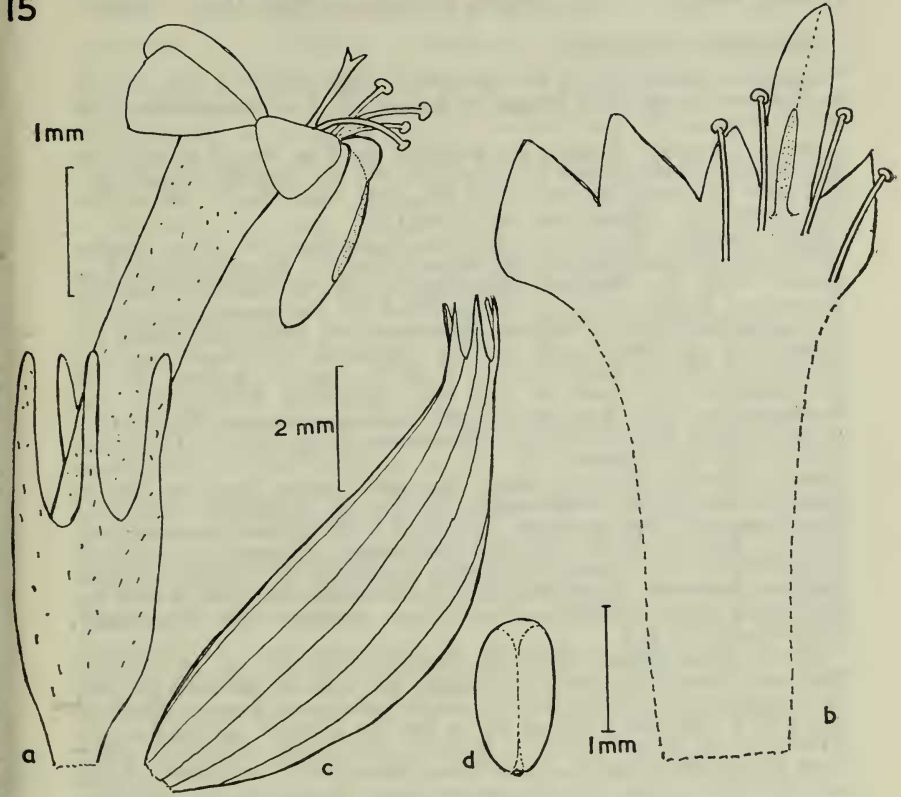


Fig. 15. *Hyptis rhomboidea* Mart. & Gal.

a. flower; b. corolla expanded; c. fruiting calyx; d. nutlet (fresh material).

Distribution: A native of tropical America, naturalized in many parts of the tropics.

Ecology: In open waste places, a common weed.

Vern. names: Sawa hdijkje (Java); Oaga bini (Brunei) Tembuku-tembuku, Dan buku napsu (N. Borneo); Timan-Timan (Borneo); Abgoanam, Tatabak, Ilite bubung, Merara welana (Lesser Sunda); Aring Kaming (Celebes); Pupu (New Guinea).

Specimens examined:

Sumatra: Riau, alt. 20 m, *Bünnemeijer* 5970 (L); P. Lingga, alt. 30 m, *Bünnemeijer* 6672 (L); Lingga, P. Sinkep, alt. 5 m, *Bünnemeijer* 7234 (L); Palembang, alt. 3 m, *Raadt* 13 (L).

Malay Peninsula: Pangkor Is., Pangkor, alt. 7 m, *Burkill & Shah* 284 (L); Kuala Lumpur, *Monod de Froideville* 646 (L); Pahang, Fraser's Hill, alt. 1400 m, *Purseglove* 4253 (L); Singapore, Ama Keng Village, Lim Chu Kang Road, *Sinclair s.n.* Jan. 1951 (L).

Java: Batavia, *Backer s.n.* 1902 (L); Pasoeroean, alt. 20 m, *Backer* 7973 (L); Soekaboemi, alt. 600 m, *Backer* 14528 (L); Pekalongan, alt. 5 m, *Backer* 15468 (L); Madoera, Soemenap, alt. 25 m, *Backer* 21249 (L); Pasoeroean, Bangil, alt. 20 m, *Backer* 37465 (L); Pasoeroean, Kepoch, alt. 75 m, *Backer* 37691 (L); Batavia Tjikeumeuh, alt. 250 m, *Bakhuizen v/d Brink* 3659 (L); Batavia, alt. 250 m, *Bakhuizen v/d Brink* 9518 (L); Batavia, alt. 325 m, *Bakhuizen v/d Brink Jr.* 1040 (L); Batavia, alt. 250 m, *Bakhuizen v/d Brink Jr.* 1976 (L); Buitenzorg, *Boerlage s.n.* (L); Bawean Is. alt. 2 m, *Buwalda* 3353 (L); Soerabaja *Dorgelo* 142 (L); Cult. in Hort. Bogor, *Hallier D* 284 (L); Soekaboemi, *Hoed* 3010 (L); Banjoemas, *Kieviets* 1769 (L); Batavia, alt. 150 m, *Koorders s.n.* (L); Pekalongan, Soebah, *Koorder* 36904 (L); Bogor, Batutapak, Sedane River, alt. 260 m, *Nedi & Idjan* 15 (L); Buitenzorg, alt. 240 m, *Ooststroom* 13898 (L); Boeabatoe, alt. 700 m, *Popta* 174/45 (L); Soekalilah, Soerabaja, alt. 1-5 m, *Rant & Coert* 221 (L); Buitenzorg, Tjibogen, alt. 250 m, *Schiffner* 2477 (L); Batavia, Kampong Nangrang, alt. 250 m, *Schiffner* 2407 (L); Buitenzorg, horto botanico, alt. 250 m, *Schiffner* 2484 & 2868 (L); Buitenzorg, horto botanico, alt. 260 m, *Schiffner* 2498 (L); Bogor, *Soegandiredja* 71 (L).

Lesser Sunda Islands: Lombok, Mataram, alt. 500 m, *Bloembergen* 3024 (L); Timor, Kp. Bioba, G. Timaoe, alt. 1300 m, *Bloembergen* 3380 (L); Sumbawa, Bima, *Colfs* 208 (L) (several collections); Lombok, Rindjani, alt. 0-20 & 500-700 m, *Elbert* 560 & 764 (L); Lombok, G. Rindjani, alt. 1185-1265 m, *Elbert* 1567 (L); Sumbawa, Bima, alt. 75-250 m, *Elbert* 3540 (L); Sumbawa, Bima, alt. 75-250 m, *Elbert* 3540 (L); Sumbawa, Bima, alt. 100-300 m, *Elbert* 3587 (L); Soemba, Mao Marroe, *Iboet* 461 (L); Alor, alt. 300 & 500 m, *Jaag* 147 & 1339 (L).

Borneo: North Borneo, Pembiangan, *Amadjah* 838 (L); North Borneo, Pembiangan, *Amadjah s.n.* (L); Sarawak, *Brooke* 9844 (L); Sarawak, *Brooke* 10649 (L); North Borneo, Kinabalu, alt. 1700 m, *Clemens* 28884 (L); North Borneo, Sandakan, *Cuadra A* 2384 (L); Pontianak, alt. 6 m, *Ench* 353 (L); North Borneo, Sandakan, *Kadir A* 1660 (L); North Borneo, Sandakan, *Kadir A* 2687 (L); Borneo, *Korthals s.n.* (L) (several collections).

Philippines: Batangas, Mataasnakahay, *Aranez* 19 (L); Luzon, Camarines Sur, Pili, Carambola, *Convocar* 2963 (L); Luzon, Laguna, *Cuning* 591 (L); Luzon, Sorsogon, Irosin, Mt. Bulsan, *Elmer* 14380 (L); Rizal, Montalban, *Gongales* 60 (L); Rizal, Antipolo, *Guia* 62 (L); Luzon, Albay, Mayon Volcano, alt. 600 m, *Memdoza* 1383 (L); Luzon, Rizal, Antipolo, *Merrill* 472 (L); Luzon, Rizal, *Ramos* 1944 (L); Sulu, Turtle Island, *Santos* 4760 (L); Bukidnon, Maramag, alt. 270 m, *Santos* 4996 (L); Malaybalay Bupiduon, Barrio Sumpung, alt. 650 m, *Santos* 6029 (L); Luzon, Laguna, Mt. Maquiling, *Servinas* 16294 (L).

Celebes: Menado, G. Ngilalakaki, alt. 1,000 m, *Bloembergen* 4109 (L); Bonto Parang, alt. 50 m, *Bünnemeijer* 10560 (L); Kabajana, alt. null to 200 m, *Elbert* 3410 (L); Masamba, alt. 400 m, *Eyma* 1128 (L); Menado, Poso, alt. 1,250 m, *Eyma* 1690 (L); Goeroepahi, alt. 600 m, *Kaudern* 60. (L); Minahassa, Menado, *S. H. Koorders* 17373, 17374, 17378 17380 (L); Talaud, P. Karakelong, alt. 5 m, *Lam* 2496 (L); Minahassa, alt. 300 m, *Lam* 2419 (L); Menado, alt. 1,200 m, *Posthumus* 2303 (L); Celebes, *Rant* 906 (L).

Moluccas: Morotai, alt. 10 m, *Anang* 194 (L); Ternate, *Atasrip* 17 (L); Aroe, Dobo, alt. *Buwalda* 4842 (L), Ceram, Kp. Kiandarar, alt. for m., *Buwalda* 5829 (L); Ceram, Waihai, alt. 100 m, *Kaornassi* 19 (L); Ambon, alt. 0 m, *Kornassi* 1093 a (L); Ternate, alt. 1,400 m, *Pleyte* 58 (L); Saparoea, *Reinwardt*, s.n. (L); Ceram, alt. 50 m, *Rutten* 1612 (L); Ambon, *Saänan* 39 (L); Ternate, *Teymann* 7456 (L).

New Guinea: Morobe, *Brass* 32512 (K); Madang, alt. 125 m, *Hoogland* 4856 (L); Fakfak, *Kalkman* 6350 (K, L); Amboina, *Robinson* 2002 (L); New Britain, Gazelle Peninsula, alt. 70 m, *Womersley & Jones* 8789 (L).

This weed generally recorded as *Hyptis capitata* Jacq. in literature, is extensively distributed in the Malesian region. Epling first referred it to *Hyptis decurrens* (Blanco) Epling, but later identified it as *Hyptis rhomboidea* Mart. & Gal. His later identification is accepted here.

The following specimens have been referred to *Hyptis lanceolata* Poit. by Briquet and to *H. celebica* Zoll. by Koorders respectively: *Cuming* 591 from the Philippines, and *Koorders* 17373, 19374, 17378 & 17380 all from Celebes. They are indistinguishable from *H. rhomboidea* Mart. & Gal.

3. *Hyptis spicigera* Lam. Encycl. 3 (1789) 185; Benth. in DC. Prodr. 12 (1848) 87; Miq. Fl. Ind. Bat. 2 (1858) 958; Merr. Enum. Philip. 3 (1923) 417.

Pycnanthemum elongatum Banco. Fl. Filip. ed. 2 (1845) 333, ed. 3, 2 (1878) 252.

An erect annual herb, 1–1.5 m high. Stems scabrous: branches glabrous or only slightly pubescent. Leaves herbaceous, lanceolate to elliptic-lanceolate, 2.5–6 cm long, 1.2–3 cm wide, acute or acuminate, the base acuminate, decurrent; margins serrulate, glabrous or glabrescent on both surfaces; petioles 0.5–2.5 cm long. False whorls many-flowered, forming dense spike-like or head-like inflorescence, 1–1.5 cm (in fruit 3–4.5 cm) long, terminal and in upper leaf-axils; bracts subulate, 3–4 mm long, setaceous. Calyx tubulate, 4–5 mm (in fruit 6–7 mm) long, ribbed, reticulate; teeth subulate, 2 mm long, setaceous. Nutlets ellipsoid, compressed, 1.2 mm long, finely granulate.

Distribution: A native of tropical America, now widely spread in several parts of Malesia (Lesser Sunda Islands, Borneo, the Philippines, Celebes, Moluccas) and in Marianne Islands.

Ecology: In open dry grasslands.

Specimens examined:

Lesser Sunda Islands: Timor, *Riedel* s.n. June 1883 (K); Soemba, *Teysmann* s.n. (L).

Borneo: Borneo, *Korthals* (several collections) (L); Bandjermasin, *Motley* 417 (K).

Philippines: Palawan, *Bermejor* 188 (K); Mindanao, Davao, *Copeland* 540 (K); Quezon City, *Guia* 28 (L); Luzon, *Loher* s.n. (K); Sto. Domingo, *Mendo* 2, (L); Luzon, Bataan, Mt. Marivales, Lamao River, *Merrill* 3293 (K, L); Luzon, Rizal, Antiopolo, *Merrill* sp. *Blanco* 108 (K, L); Luzon, Zambales, Anuling, *Ramos & Edano* 44701 (L); Philippines. *Vidal* 3469 & 3496 (K); Luzon, Bataan, Whitford s.n. 1904 (K).

Celebes: Baeolo, alt. 900 m, *Bünnemeijer* 12571 (L); Muna, alt. 0–125 m, *Elbert* 2897 (K, L) & 7065 (L); Buton, alt. 0–75 m, *Elbert* 2595 (L); Lasao, alt. 100 m, *Kjellberg* 1175 (L); Kp. Mara, *Noerkas* 216 (L) (two collections).

Moluccas, Boeroe, *Teysmann* s.n. 1859–1860 (L).

4. ***Hyptis pectinata*** (Linn.) Poit. in Ann. Mus. Paris 7 (1806) 474, t. 30; Benth. Lab. Gen. & Sp. (1833) 127; Miq. Fl. Ind. Bat. 2 (1858) 960; Mukerj. in Rec. Bot. Surv. Ind. 14, 1 (1940) 46; Back. & Bakh. f. Fl. Java 2 (1965) 634.

Nepeta pectinata Linn. Syst. Nat. ed. 10 (1759) 1097.

Erect perennial herb, often shrubby, 0.5–1 m or more high. Stems and branches glabrous or pubescent. Leaves herbaceous, ovate or elliptic, 2–3 cm long, 1–1.5 cm wide, acute or acuminate, the base rounded or truncate, entire; margins elsewhere serrate or more often crenate, glabrous or glabrescent above, sparsely or densely tomentose and glaucous beneath. Spurious racemes 4–8 (–15) cm long, consisting of 10 to many secund cymes, densely congested toward apex, generally forming large, terminal panicles; cymes 6–15-flowered, subcapitate, secund, pectinate, incurved; bracts crinite and setaceous. Calyx tubular, 2–2.5 mm (in fruit 3–4 mm) long, tomentose; teeth subulate, setaceous, slightly longer than the calyx-tube. Corolla 3–3.5 mm long. Nutlets small, oblong, 1.5–2 mm long, smooth, black.

Distribution: A native of American tropics, now occurs in many parts of the world.

Ecology: In open waste places.

Specimens examined:

Java: Java, *Backer s.n.* 1902 (L); Batavia, *Backer s.n.* 1903 (L); Soekaboemi, alt. 400 m, *Backer 14854* (L); Soekaboemi, alt. 500 m, *Backer 21439* (L); Batoetoelis, alt. 350 m, *Backer 22061* (K, L); Buitenzorg Tegal Sapi, alt. 240 m, *Bakhuizen v/d Brink Jun. 1014* (K, L); Buitenzorg, *Boerlage s.n.* (L); Depok, *Burck & Monchy s.n.* (L); Buitenzorg, *Hallier 283 a & b s.n.* (L) Bogor, *Hallier 285* (L); Buitenzorg, Tjikopoh, alt. 1,600 m, *Hoed 3182* (L); Depok, *Koorders 31131* (L); Bandoeng, alt. 800 m, *Popta 249/76* (L); Bandoeng, alt. 700 m, *Popta 757/216* (L); Bantardjati, *Raap 536* (L); Batavia, Tjiliwung, alt. 250 m, *Schiffner 2483* (L); Buitenzorg, Tjiliwung, alt. 240 m, *Schiffner 2492* (K, L).

5. ***Hyptis suaveolens*** (Linn.) Poit. in Ann. Mus. Paris 7 (1806) 472, t. 29, f. 2; Benth. Lab. Gen. & Sp. (1833) 124, in DC. Prodr. 12 (1848) 126; Miq. Fl. Ind. Bat. 2 (1858) 959; Hook. f. Brit. In. 4 (1885) 630; Prain, in J. As. Soc. Bengal 74, 2 ext. no. (1907) 705; Ridl. Fl. Mal. Pen. 2 (1923) 645; Merr. Enum. Philip. Fl. Pl. 3 (1923) 417; Kudo in Mem. Fac. Sc. & Ag. Taihoku Un. 2, 2 (1929) 147; Mukerj. in Rec. Bot. Surv. Ind. 14, 1 (1940) 63; Back. & Bakh. f. Fl. Java 2 (1965) 634.

Ballota suaveolens Linn. Syst. Nat. ed. 10 (1759) 1100.

Bysteropogon graveolens Bl. Bijdr. (1826) 824.

Marrubium indicum (non Burm. f.) Blanco Fl. Filip. (1837) 477, ed. 2 (1845) 352.

A strongly aromatic, much-branched herb, 0.5–1.5 m high. Stems hirsute, 4-angled. Leaves firmly herbaceous, ovate to broadly obovate, 3–5 cm long, 2–4 cm wide, subacute; base rounded, truncate, often slightly oblique; margins irregularly serrulate; sparsely pilose above, densely pubescent beneath; petioles slender, 0.5–3 cm long, sparsely pubescent. Flowers in

lax, 2-5-flowered, secund cymes, arranged racemously towards ends of branches in the axils of smaller leaves; peduncles pubescent, 0.5-1 cm long; bracts minute, setaceous. Calyx campanulate, 5-5.5 mm (in fruit 8-10 mm) long, strongly ribbed; mouth villous; teeth erect, setaceous. Corolla blue; tube slender. Nutlets narrowly oblong, 1.2-1.5 mm long, often emarginate at the top, faintly rugose.

Distribution: Tropical America; introduced and widely spread in tropical Asia and Africa.

Ecology: A weed in open and dry waste places at low and medium altitudes.

Vern. names: Selasie (Sumatra).

Specimens examined:

Sumatra: Serdang, alt. 2 m, *Lorzing* 13406 (L); Pajakumbuh, Indarug, *Meijer* 6002 (L); Palembang, alt. 20 m, *Verboom* 5 (L); Painan, alt. few m, *Waalkes* 1701 (L).

Malay Peninsula: Port Dickson, *Monod de Froideville* 717 (L); Selangor, Kanching, alt. low, *Nur* 34414 (L); Singapore, Potong Pasir, *Sinclair* s.n. Dec. 1948 (L).

Java: Pasoeroean, alt. 10-15 m, *Backer* 7544 (L); Besoeki, alt. 1 m, *Backer* 37066 (L); Soerabaja, alt. 1 m, *Backer* 37300 (L); Besoeki, alt. 5 m, *Backer* 37690 (L); Djombang, *Bovien* no. *Djomb* 14 (L); Besoeki, *Poeger*, alt. 1 m, *Buwalda* 7167 (L); Besoeki, *Sitoebondo*, *Buwalda* 7414 (L); Kediri, *Coert* 1701 (L); Besoeki, alt. 10 m, *Dillewijn* s.n. 1928 (L); Soerabaja, *Dorgelo* 134 (L); Soerabaja, alt. 15 m, *Dorgelo* 392 (L); Soerabaja, alt. 15 m, *Dorgelo* 535 (L); Semarang, alt. 15-20 m, *Houwing* s.n. 1924 (L); Bandoeng, *Karsten* 14 (L); Garoet, G. Goentoer, alt. 1,000 m, *Karsten* 51 (L); Bogor, alt. 250 m, *Kern* 7278 (L); Banjoemas, *Kievits* no. *Banj.* 29 (L); Bangjoemas, *Kievits* 1501 (L); Banjoemas, *Kievits* 2541 (L); Sumbing, alt. 1,300 m, *Lorzing* 177 (L); Bogor, *Tjiomas*, *Nedi & Idjan* 206 (L); Buitenzorg, alt. 240 m, *Ooststroom* 12552 (L); Buitenzorg, *Kuripan*, *Ooststroom* 13761 (L); Bandoeng alt. 700 m, *Popta* 833/240 (L); Batavia, alt. 230 m, *Schiffner* 2467 (L); Batavia, alt. 250 m, *Schiffner* 2482 (L); Anjer, *Visser* *CI* 3401 (L).

Philippines: Malaybalay, Bukidnon, *Santos* 6048 (L); Luzon, Quezon, lowland, *Villaflor* 37540 (L).

New Guinea: Papua, *Brass* 1172 (K); Papua, *Carr* 12384 (K); Morobe, *Heutz* 11698 (K).

16. LEONURUS LINN.

Leonurus Linn. Gen. Pl. ed. 5 (1754) 254, Sp. Pl. (1753) 584; Benth. in Benth. & Hook. f. Gen. Pl. 2 (1876) 1210; Briq. in E. & P. Pfl. Fam. 4, 3a (1897) 256.

Erect herbs. Leaves opposite, often lobed or dissected. Bracts subulate. Calyx turbinate, 5-nerved and 5-toothed, the teeth more or less equal, spinescent, spreading. Corolla naked or annulate within, 2-lipped; upper lip entire, erect; lower lip 3-lobed, the mid-lobe very large, deeply notched. Stamens 4, in 2 pairs, ascending under the upper lip; lower pair slightly

longer; anthers 2-loculate, the locules parallel, transverse, connivent. Disk uniform. Style equally 2-fid, the branched obtuse or subulate. Nutlets dry, smooth, triquetrous, truncate at the apex.

Species about 8, mainly in temperate regions of Asia and Europe; 1 extended into tropics as a weed, sometimes cultivated as a garden plant.

1. **Leonurus sibiricus** Linn. Sp. Pl. (1753) 584; Bl., Bijdr. (1826) 823; Benth. in DC. Prodr. 12 (1848) 501; Miq. Fl. Ind. Bat. 2 (1859) 978; Prain in J. As. Soc. Bengal 74, 2 (1907) 720; Ridley, Fl. Mal. Pen. 2 (1923) 651; Merr. Enum. Philip. 3 (1923) 412; Mukerj. in Rec. Bot. Surv. Ind. 14, 1 (1940) 193; Back. & Bakh. f. Fl. Java 2 (1965) 623.

Stachys artemisiae Lour. Fl. Cochinch. (1790) 365; Blanco, Fl. Filip. (1837) 476.

Annual or perennial herb. Stems 4-angled, furrowed, softly pubescent or glabrescent, 1–1.5 m high. Leaves chartaceous, the upper ones linear, 4–5 cm long, the lower and basal ones ovate or deltoid in outline, 5–7 cm long, 3–4.5 cm wide, palmately partite or dissected, with linear incised segments, glabrous or glabrescent above, often glaucous and pubescent on the nerved beneath; petiole 2–4 cm long. Flowers in axillary false-whorls; bracts subulate or spinescent, 0.4–1.0 cm long. Calyx turbinate, 4–5 mm (in fruit 6–7 mm) long, glabrous or sparingly pubescent; teeth 5, subulate. Corolla 10–11 mm long; tube often obliquely annulate within; limb 2-lipped; upper lip erect, obovate, entire, pubescent externally; lower lip 3-lobed, the mid-lobe obcordate, pubescent. Filaments included, epicorolline. Nutlets ellipsoid, 2 mm long, truncate above.

Distribution: A native of temperate Asia, now distributed in many warm and tropical countries.

Ecology: Sometimes cultivated as a garden plant occasionally escaped.

Vern. names: Si Saratting (Sumatra); Tebung Aga, Seranting (Malay Peninsula); Kamariang-songsong (Philippines).

Specimens examined:

Sumatra: E. Coast, Asahan, *Rahmat Si Boeea* 8386 (K).

Malay Peninsula: Malacca, Chenana Puteh, *Alvins* 966 (Sing.); Selangor, Klang, *Burkill* 1288 (Sing.); Perak, Ampang, *Burkill* 13949 (Sing.); Pahang, Pekan, *Burkill & Haniff* 17135 (Sing.); Malacca, *Griffith* 1845 (K); Kelantan, Kota Bharu, *Jupp* 257 (K); Pahan, Pekan, *Ridley* 1164 (Sing.); Selangor, Pudok, *Ridley* 10462 (Sing.); Singapore, Foot of Bukit Piatu, *Sinclair* 38857 (Sing.).

Java: Batavia, *Backer s.n.* July 1904 (K. Sing.); Java, *Horsfield s.n.* (K); Ngadisari, alt. 2,000 m, *Koorders* 37613 (K).

Borneo Sarawak, *Hullett* 376 (Sing.).

Philippines: Luzon, *Cuming* 706 (K); Luzon, *Loher* 4213 (K); Laguna, *Loher* 6686 (K); Luzon, Rizal, San Mateo, *Merrill Sp. Blanco* 947 (K).

16

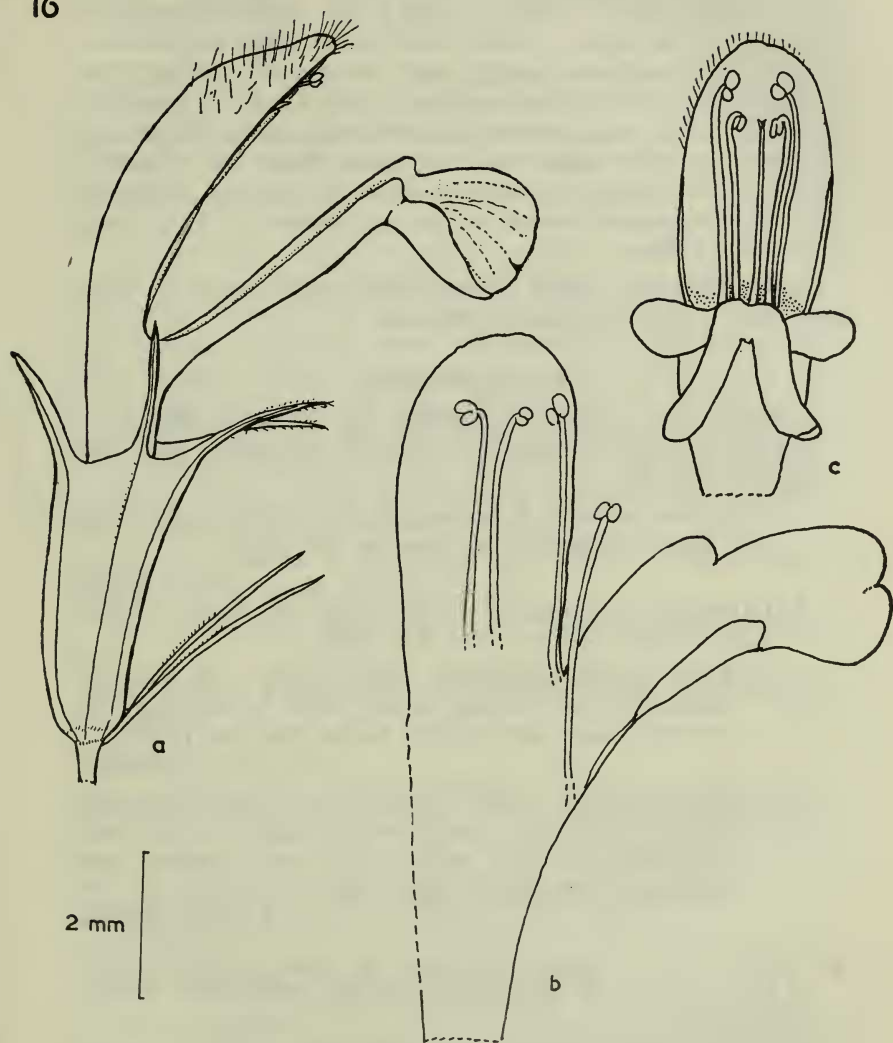


Fig. 16. *Leonurus sibiricus* Linn.

a. flower; b. corolla expanded; c. corolla, seen from above, showing the style and stamens (fresh material).

17. LEUCAS R. BR.

Leucas R. Br. Prodr. (1810) 504; Benth. in Benth. & Hook. f. Gen. Pl. 2 (1876) 1213; Briq. in E. & P. Pfl. Fam. 4, 3a (1897) 250.

Herbs or undershrubs. Stems and leaves often villous. Flowers medium or small, in dense axillary, distant false whorls; sometimes forming terminal, capitate clusters. Calyx 8–10 nerved, often striate; mouth equal or oblique; teeth 8–10, usually unequal, the posterior one the largest. Corolla-tube slender, often not exserted, annulate or not within; upper lip erect, concave, the margins often fringed with dense velutinous hairs; lower lip 3-fid, spreading, the mid-lobe very large. Stamens 4, didynamous; upper pair shorter; all ascending under upper lip, the locules divaricate, ultimately confluent. Disk entire or lobed, uniform or enlarged anteriorly. Style subulate; upper branch minute or obsolete. Nutlets ovoid, triquetrous, obtuse.

Species about 60, chiefly in warm and tropical parts of Africa and Asia; about 6 species in Malesia.

Key to the species

- A. Verticils few, usually congested into terminal cluster or clusters; mouth of calyx-tube oblique, the upper part projected forwards.
 - B. Calyx-tube tubular, 8–9 mm long (in flower); calyx-teeth 10; bracts lanceolate, as long as the calyx.
 - 1. *L. aspera*
 - B. Calyx-tube turbinate, 5–7 mm long (in flower); bracts linear, much shorter than the calyx.
 - C. Plant usually hispidous; leaves elliptic or narrowly lanceolate; calyx-mouth open; teeth 8, subequal, the posterior one only slightly larger than the others.
 - 2. *L. zeylanica*
 - C. Plant usually finely puberulous; leaves generally linear lanceolate; calyx-mouth often constricted, especially in fruit; teeth 5–9, very unequal, the posterior one much longer than the others.
 - 3. *L. lavandulifolia*
 - A. Verticils few to many, distributed in distant nodes; mouth of calyx-tube not or only slightly oblique; plants often densely tomentose.
 - B. Calyx usually hispidous or hoary on the ribs; corolla-tube barely exserted.
 - C. Calyx-teeth lanceolate; corolla-tube obliquely annulate within; two lips almost equal in length.
 - 4. *L. javanica*
 - C. Calyx-teeth subulate; corolla-tube not annulate within; lower lip much longer than the upper one.
 - 5. *L. mollissima*
 - B. Calyx tomentose or sparingly puberulent; corolla-tube long-exserted, annulate within.
 - 6. *L. flaccida*

1. *Leucas aspera* (Willd.) Link. Enum. Hort. Berol. 2 (1822) 113; Spreng. Syst. 2 (1825) 743; Benth. Lab. Gen. & Sp. (1834) 615, in DC. Prodr. 12 (1848) 532; Miq. Fl. Ind. Bat. 2 (1859) 982; Hook. f. Fl. Brit. Ind. 4 (1885) 690; Merr. Enum. Philip. Fl. Pl. 3 (1923) 410; Back. & Bakh. f. Fl. Java 2 (1965) 623. *Phlomis aspera* Willd. Enum. Hort. Berol. 2 (1809) 621.

Leucas minahassae Koorders in Kord.-Schum. Syst. Verz. 3 (1914) 112 *nom. nud.* (*syn. nov.*)

Annual herb, 30–60 cm high, often branched. Stems and branches hispidous, with spreading hairs. Leaves membranaceous, linear-lanceolate, or narrowly lanceolate, 4–6 cm long, 0.8–1 cm wide, acuminate, the base attenuate, the margins remotely crenate, tomentose on both surfaces, pilose on nerves; petioles 0.5–1 cm long, densely hispidous. Flowers subsessile, in terminal false whorls, forming globular head, 1.5–2.5 cm across; bracts narrowly lanceolate, 8–10 mm long, ciliate along the margins. Calyx 8–10 mm (only slightly accrescent in fruit) long, cylindric, the tube pilose, 10-nerved and 10-toothed, the mouth strongly oblique, the teeth erect, the posterior one the longest. Corolla 15–16 mm long, strongly curved, annulate near the middle; upper lip 2 mm long, densely velutinous, the lower lip 6 mm sparsely pubescent. Nutlets narrowly ovoid, 2.5 mm long, 0.8 mm broad, the ventral surface triquetrous, the dorsal rounded, finely granulate or nearly smooth, black.

Distribution: India to Mauritius and Malesia (Malay Peninsula, Java, Celebes and the Philippines).

Ecology: A weed often in open dry sandy soil and in waste places.

Vern. names: Karukansoli, Pansi-pansi, Sipsipa, Sulasulasipan (Philippines).

Specimens examined:

Java: Batavia, *Backer s.n.* Jan. 1903 (L); Ngawi, alt. 50 m, *Backer* 6670 (L); Madioen, alt. 60 m, *Backer* 6897 (L, Sing.); Pasoeroean, *Backer* 7733 & 8023 (L); Besoeki, alt. 5 m, *Backer* 8148 (L); Kediri, alt. 100 m, *Backer* 11626 (L); Madoera, alt. 200 m, *Backer* 19514 & 20395 (L); Pasoeroean, alt. 25 m, *Backer* 37499 (L); Pasoeroean, *Dorgelo* 31 (L); Semarang, *Houwing* 446 (L); Semarang, *Koorders* 25363 (L).

Philippines: Luzon, Manila, *Merrill* 1350 (L, Sing.); Luzon, Manila, *Merrill* 5626 (L).

Celebes: Minahassa, Manado, *Koorders* 17382 (L).

2. *Leucas zeylanica* R. Br. in W. T. Aiton, Hort. Kew. ed. 2, 3 (1811) 409; Spreng. Syst. 2 (1825) 742 (*ceylonica*); Benth. Lab. Gen. & Sp. (1834) 614, in DC. Prodr. 12 (1848) 531; Miq. Fl. Ind. Bat. 2 (1859) 982; Hook. f. Fl. Brit. Ind. 4 (1885) 689; Hallier f. in Bull. Cerb. Boiss. 6 (1898) 617; Prain in J. As. Soc. Beng. 74, 2 (1907) 718; Merr. Enum. Philip. 3 (1923) 411; Ridl. Fl. Mal. Pen. 2 (1923) 650; Back. & Bakh. f. Fl. Java 2 (1965) 623. *Phlomis zeylanica* Linn. Sp. Pl. (1753) 586.

Leucas bancana Miq. Fl. Ind. Bat. suppl. (1861–62) 572.

Leucas malayana Hance in Walp. Ann. Bot. Syst. 3 (1852–53) 269.

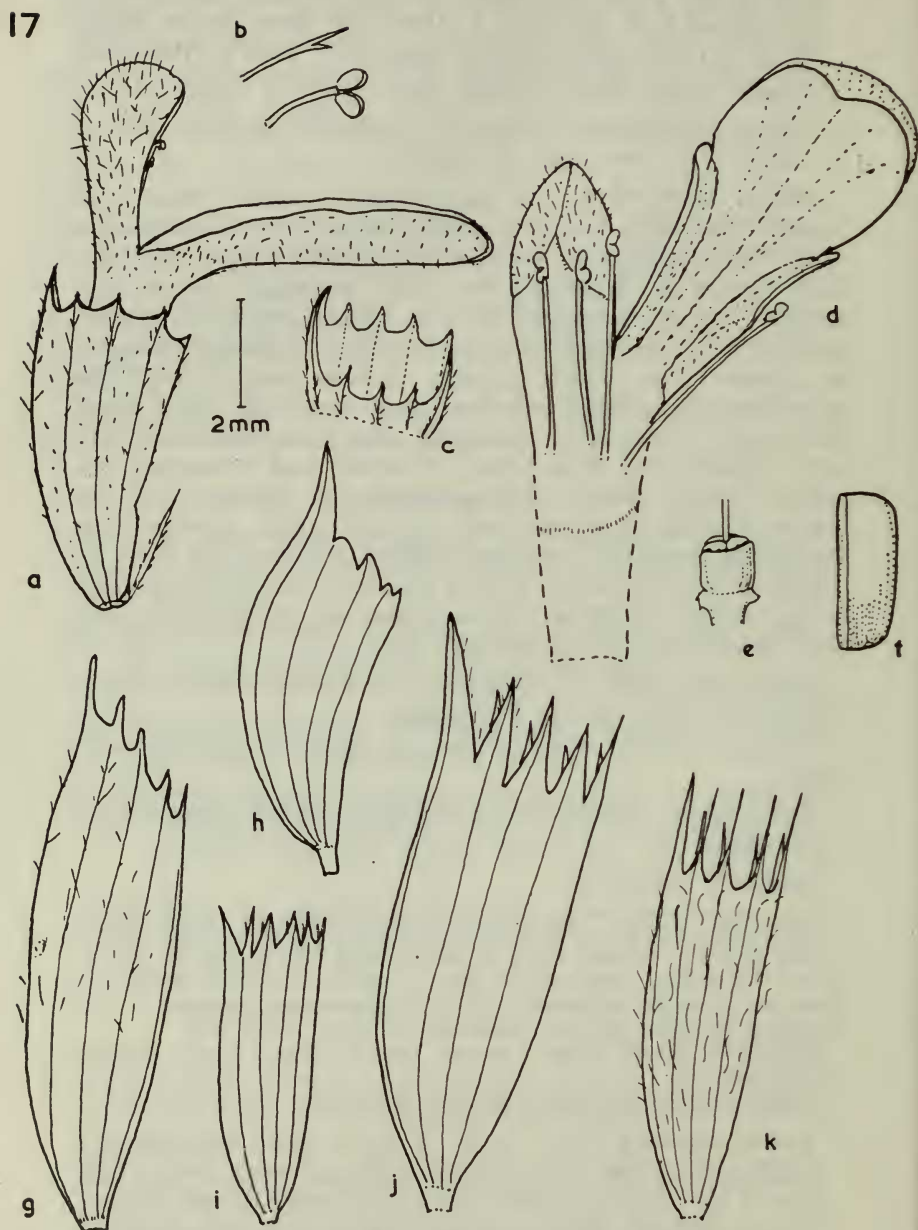


Fig. 17. *Leucas zeylanica* R. Br. (a-f) and the calyx of other species.

a. flower; b. style and stamen (upper portions); c. calyx (upper portion); d. corolla expanded; e. ovary and cup-shaped nectary disc; f. nutlet; g. *L. aspera*; h. *L. lavandulifolia*; i. *L. flaccida*; j. *L. javanica*; k. *L. mollissima*. (a-f, fresh material; g. Backer 11626; h. de Wit 3951; i. Eyma 306; j. Backer 3003; k. Merrill 11539).

Annual herb, 20–60 cm high, often branched. Stems and branches hispid. Leaves membranaceous, lanceolate, 4–5.5 cm long, 1–1.3 cm wide, acuminate, the base attenuate, entire; margins elsewhere remotely serrate, hirsute on both surfaces; petioles 0.2–0.8 cm long, hispid. Flowers subsessile, in terminal false-whorls, usually 6–8 forming a globular head, 1.5–2 cm across, occasionally also axillary false-whorls occur below; bracts linear, 4–5 mm long, spinescent. Calyx turbinate 5–6 mm (in fruit 7–8 mm) long, slightly curved, hispid, 10-nerved and 8-toothed; the mouth slightly oblique, pubescent within; the uppermost tooth slightly longer than the rest. Corolla 8 mm long, the tube annulate near the middle; upper lip obovate, white-woolly; lower lip patent, 3–4 mm long, 3-lobed. Nutlets obovoid, 3 mm long, 1 mm broad, apex truncate; ventral surface angular, dorsal rounded; smooth.

Distribution: Throughout southern and south-eastern Asia.

Ecology: In open grasslands at low altitudes, sometimes as a weed.

Vern. names: Ketumbit (Malay Peninsula); Guma-guma, masibulan (Philippines).

Specimens examined:

Sumatra: Simaloer, *Achmad* 683 (L); Atjeh, *Asdat* 162 (L); Asahan, *Bartlett & Rue* 51 (L); W. Coast, *Borssum Waalkes* 1647 (L); Banka, *Muntok, Bünnemeijer* 1477 (L); G. Malintang, alt. 800 m, *Bünnenmeijer* 3807 & 4445 (L); Riouw Arch., *Bünnemeijer* 5990 (L); P. Bintan, *Bünnemeijer* 6112 (L); Lingga Arch., *Bünnemeijer* 6869 (L); Palembang, *Monod de Froideville* 534 (L); E. Coast, *Surbeck* 347 (L).

Malay Peninsula: Pangkor Isl., *Dindings, Burkill & Shah* 277 (K, L, Sing.); Johore, P. Pisang, *Burkill & Kiah* 647 (L, Sing.), Penang *Curtis* 409 (Sing.); Johore, Jason Bay, *Corner* 28531 (K, Sing.); Pahang, Pekan, *Evans s.n.* July 1917 (K); Perak, Taiping, *Henderson* 10292 (Sing.); Perak, Lima Blus Estate, *Reed* 5 (Sing.); Singapore, *Robinson* 5708 (K); Selangor, *Seimund s.n.* June 1921 (K); Malacca, *Shah* 31 (K, L, Sing.); Singapore, *Sinclair* 39143 (L); S. Johore, *Spare F* 749 (K); Lumut, Dindings, *Strugnell* 27082 (L); Kelantan, G. Kedah, *Symington* 37955 (Sing.).

Java: Banten, *Adelbert s.n.* 1954 (L); Karangampel, *Backer* 16793 (L); Madoera, *Backer* 18997 & 19854 (L); Besoeki, *Backer* 37069 & 37196 (L); Buitenzorg, alt. 250 m, *Bakhuizen v/d Bring* 1941 (L); Buitenzorg, *Hallier* 171 a (L); Semarang, *Karta* 220 & 418 (L); Java, *Kievits s.n.* Sept. 1923 (L); Banjoemas, *Kievits* 2523 (L); Bagelen, *Koorders* 26225 (L); Tegal, *Winckel s.n.* Oct. 1917 (L).

Lesser Sunda Islands: Kisar, *Bloembergen* 3857 (L); Lombok, *Elbert* 601 (L).

Borneo: Sandakan, *Emler* 20235 (L); Soeka Lanting, *Hallier* 57 (L); Sandakan, *Kadir* 2887 (L); Sarawak, Sematan, *Purseglove* 4614 (L).

Philippines: Leyte, Tacloban, *Frohne* 35091 (L); Sulu Arch. *Kondo & Edano* 38765 (L); Davao, *Loher* 4203 (K); Luzon, Bataan, *Merrill* 3095 (K, L); Luzon Bataan, *Whitford* 514 (K).

3. *Leucas lavandulifolia* Sm. in Rees. Cycl. 20 (1812) n. 2; Prain in J. As. Soc. Beng. 74 (1907) 719; Merr. Enum. Philip. 3 (1923) 411; Ridl. Fl. Mal. Pen. 2 (1923) 650; Mukerj. in Rec. Bot. Surv. Ind. 14, 1 (1940) 167; Back. & Bakh. f. Fl. Java 2 (1965) 623.

Phlomis linifolia Roth, Nov. Sp. (1821) 260.

Leucus linifolia (Roth) Spreng. Syst. 2 (1825) 743; Benth. Lab. Gen. & Sp. 617 (1834) 744 (1836), in DC. Prodr. 12 (1848) 533; Miq. Fl. Ind. Bat. 2 (1859) 983; Hook. f. Fl. Brit. Ind. 4 (1885) 690.

Phlomis zeylanica (non Lin.) Blanco Fl. Filip. (1837) 475 (*ceilanica*).

Erect annual herb, 30–80 cm high, often much-branched. Stems and branches pubescent, subglaucous. Leaves herbaceous, linear lanceolate, rarely lanceolate, 4–6 cm long, 0.4–0.6 cm wide, acuminate, the base attenuate, entire, margins elsewhere subentire or remotely and sparingly serrate; petiole subsessile. Flowers shortly pedicelled, in terminal and axillary, always leafy false-whorls, often congested towards apex and forming cluster or clusters, 1.5–2 cm across; bracts linear, 3–4 mm long, puberulous. Calyx obliquely turbinate, 6–7 mm (in fruit 8–9 mm) long, glabrescent or puberulent; mouth oblique, pubescent within with white hairs, slightly constricted; teeth varying from 8–10, the uppermost one large and broad, others minute and spinescent. Corolla 10 mm long; tube annulate within near the middle; upper lip oblong, woolly; lower lip patent, the mid-lobe large, obovate. Nutlets oblong, 2.5 mm long, 1 mm broad, rounded at apex, inner surface angular, outer rounded.

Distribution: India to S. China and Malesia.

Ecology: in open waste places at low and medium altitudes.

Vern. names: Patji-patji (Java) Pansi-pansit (Philippines).

Specimens examined:

Sumatra: Tapanoeli, Habinsaran, *Bartlett* 7780 (L); Kabandjahe, alt. 1,225 m, *Lörzing* 6180 (L); Lake Toba, alt. 1,200 m, *Lörzing* 6538 (L); Tapanoeli, Maranti, *Rahmat Si Boeca* 6152 (L); Padang Boelan, *Stomps* s.n. Oct. 1923 (L).

Malay Peninsula: Penang, Bukit Penang, *Curtis* 1115 (Sing.); Penang, Tanjong Tokong, *Curtis* 2491 (Sing.) (Corolla white); Malacca, *Griffith* s.n. (K); Singapore, *Hullett* 377 (Sing.); Malacca, *Ridley* s.n. 1890 (Sing.); Singapore, Mt. Faber, *Ridley* 3888 (Sing.); Singapore, *Sinclair* 39142 (L, Sing.).

Java: W. Banten, *Adelbert* 338 (L); G. Tjeremai, alt. 700 m, *Backer* 4991 (L); G. Lawoe, alt. 700 m, *Backer* 6732 (L); Kediri, alt. 100 m, *Backer* 11627 (L); Weleri, alt. 200 m, *Backer* 16603 (L); Pasoeroean, *Backer* 36200 (L); Batavia, *Bakhuizen v/d Brink* 1021 & 2125 (L); Kediri, *Coert* 1690, 1737, 1781 & 1813 (L) Madioen, *Dorgelo* 1535 (L); Buitenzorg, *Hallier* 288 (L); P. Purmerend, *Hoed* 3082 (L); Semarang, *Houwing* 918 (L); Java, *Junghuhn* 31 (L); Bawean, *Karta* 11 (L); Madioen, alt. 700 m, *Koorders* 23143 & 23278 (L); Semarang, *Koorders* 25096 & 27629 (L); Banjoemas, *Koorders* 27177 (L); Madioen, *Koorders* 29141 (L); Buitenzorg, *Koorders* 31306 & 32577 (L); Batavia, *Koorders* 44153 (L); Buitenzorg, *Oostroom* 12874 (L); Buitenzorg, *Raap* 64 (L); Batavia, *Schiffner* 2473 (L); Bogor, *Soegandiredjo* 96 (L); Buitenzorg, *Wit* 3951 (L).

Philippines: Luzon, *Cuming* 709 (K, L); Luzon, Sorsogon, Irosin, *Edano & Gutierrez* 37764 (L); Luzon, Sorsogon, *Elmer* 16481 (K, L); Luzon, Laguna, Los Banos, *Hallier* 4075 (L); Luzon, Loher 4204 (K); Luzon, Manila, *McGregor* 45 (K); Luzon, Rizal, Antipolo, *Merr.* Sp. *Blanco* 324 (K, L); Manila, *Merrill* 347 (K); Mindoro, Baco, *Merrill* 1266 (K); Manila, *Merrill* 1351 (L); Luzon, Tayabas, *Merrill* 1956 (K); Luzon, Rizal, *Merrill* 2728 (K); Luzon, Laguna, San Antonio, *Ramos* 12046 (L); Luzon, *Vidal* 3467 (K).

Celebes: Manado, *Forsten* 48 (L).

Moluccas: Soela Isl., Sanana, alt. 200 m, *Bloembergen* 4462 (L); Soela Isl., Mangoli, *Bloembergen* 4633 (L); Ceram, *Kornassi* 831 (L); Ceram, *Kornassi* 1298 (L); Halmahera, *Pleyte* 76 (L); Ceram, *Rutten* 169 (L).

New Guinea: Misoöl group, *Eykman* 52 (L); Misoöl group, *Pleyte* 835 (L).

4. *Leucas javanica* Benth. Lab. Gen. & Sp. (1834) 611, in DC. Prodr. 12 (1848) 528; Miq. Fl. Ind. Bat. (1859) 980; Vidal Rev. Pl. Vas. Filip. (1886) 214; Merr. Enum. Philip. Fl. Pl. 3 (1923) 410; Back. & Bakh. f. Fl. Java 2 (1965) 622.

Phlomis chinensis (non Retz.) Bl. in Bijdr. (1826) 829.

Leucas biflora (non R. Br.) Miq. Fl. Ind. Bat. 1859) 980.

Leucas procumbens (non Desf.) Miq. Fl. Ind. Bat. (1859) 979.

Leucas leucocephala Miq. Fl. Ind. Bat. (1859) 981.

Leucas oxyodon Miq. Fl. Ind. Bat. (1859) 981.

Perennial herb, to 1.5 m high, branched. Stems and branches tomentose, sometimes densely long-villose, subglaucous. Leaves thin membranaceous, ovate to broadly ovate, 3–4 cm long, 2.5–3 cm wide, (sometimes very small, 1.5 x 1.2 cm) acute, the base rounded or truncate, the margins elsewhere coarsely serrate or crenate; pubescent or hirsute on both surfaces; petiole 0.2–0.5 cm long. Flowers 2–6 (sometimes more) in axillary whorls, remotely distant; bracts linear, 2–3 mm long, setose. Calyx subcampanulate, usually 8–9 mm (in fruit 10–11 mm) long, sparsely hirsute or densely long-villose externally, 10-toothed, the teeth lanceolate, subequal or alternately larger and smaller ones, the posterior one the largest, 2–2.5 mm long. Corolla 15–16 cm long, obliquely annulate; two lips almost equal in length. Nutlets ellipsoid, 2 mm long, 1 mm broad, scabrous.

Type specimen: Java: Intra montem Burangrang et Tankawam Paku, Blume. *Herb. Lugd. Bat.* 904, 356–479 (L.)

Distribution: Malesia.

Ecology: In open waste places, thickets and grassland, at low and high altitudes.

Vern. names: Patji-patji (Java), Banbansit, Paling-harap (Philippines).

Specimens examined:

Java: Preanger, *Backer* 966 (L); Preanger, alt. 550 m, *Backer* 3003 (L); Tueschen Bantoer, alt. 300 m, *Backer* 4001 (L); Djatioroto, alt. 20 m, *Backer* 8089 (L); Tjidjoeroeg, *Backer* 17284 (L); Madoera, alt. 50 m, *Backer* 19397 (L); Batavia, alt. 934 m, *Bakhuizen v/d Brink* 4975 (L); Pasanggahan, *Boerlage* 3819 (L); Buitenzorg, *Binnemeijer* 94 (L); Parangtritis, *Coert* 446 (L); Madura, *Coert* 1674 (L) (Fls. white); Tjemaralela, *Coert* 3453 (L); Moeriah, *Docters van Leeuwen* 944 (L); Soerabaja, *Dorgelo* 207 (L); Bogor, *Hallier* 290 (L); Buitenzorg, *Hallier* s.n. Oct. 1894 (L); Dieng, alt. 2,000 m, *Hochreutiner* 2396 (L); Tengger, Mt. Ajak-ajak, alt. 2,800 m, *Hochreutiner* 2662 (L); Sindiglaja, *Holstvoogd* 119 (L); Java, *Horsfield* s.n. (K. type of *Leucas leucocephala* Miq.), *Horsfield* s.n. (K. type of *Leucas oxyodon* Miq.) Tjikampek, *Karsten* 30 (L); Tjibodas, G. Gedeh, alt. 1,500 m, *Kern* 7411 (L); Pasoeroean, *Kobus* 72600 (L); Besoeki, alt. 1,150 m, *Koorders* 14829 (L); Madioen, alt. 1,300 m, *Koorders* 23286 (L); Pasoeroean, *Koorders* 23377 (L); Semarang, *Koorders*

24999 (L); Madioen, alt. 800 m, *Koorders* 29777 (L); Djapara, *Koorders* 33549 (L); Pasoeroean, alt. 2,100 m, *Koorders* 37625 (L); Besoeeki, *Koorders* 38525 (L); Gempolkrep, *Kreulen* 119 (L); Beneden, *Lörzing* 2238 (L); Panaragan, *Nedi & Idjan* 11 (L); Tjibodas, G. Gede, *Ooststroom s.n.* May 1950 (L); Bandoeng, *Popta* 470 (L); Lembang, *Popta* 763 (L); Bantardjati, *Raap* 528 (L); Tjisaroea, *Raap* 893 (L); Buitenzorg, alt. 260 m, *Schiffner* 2468, 2476 & 2480 (L); Soerabaja, *Slooten* 2031 (L); Priangan, G. Papandajan, alt. 2,401 m, *Steenis* 4275 (L); Pasoeroean, alt. 2,400 m, *Steenis* 7249 (L); Besoeeki, alt. 2,300 m, *Steenis* 10926 (L).

Lesser Sunda Islands: Babar, *Borssum Waalkes* 3006 (L); Soemba, *Iboet* 188 (L); Tanimbar, *Pleyte* 125 (L); Lombok, *Zollinger s.n.* July 1846 (L).

Philippines: Luzon, *Ahern's Collector* 3401 (K); Philippines, *Cuming* 495 (K, L); Mindanao, Pujada Isl., *Edano* 11665 (L); Luzon, Laguna, *Elmer* 8104 (K); Luzon, Laguna, Mt. Maquiling, *Elmer* 18079 (K, L); Luzon, *Loher* 4224 (K); Coron Isl., *Ramos* 41158 (K); Luzon, Laguna, Mt. Makiling, *Sulit* 34065 (L); (Fls. white).

New Guinea: Papua, Sudest Isl., Rambuso, *Brass* 28094 (K, L) (Lvs. not aromatic; fls. white).

This is an extremely variable species, with regard to the density of verticillasters (from 2–3, 5–6 or more flowers), the pubescence of the calyx tube, the length of the calyx-teeth, and the dimension (1.5–4 x 1.2–3 cm) and texture (fleshy or herbaceous) of the leaves. Based on the various combination of these characters, Miquel (1859) recognized 3 varieties (var. *horsfieldiana*, Miq., var. *montana*, Zoll. and var. *littoralia* Zoll.) and also described 2 new species, *Leucas leucocephala*, and *Leucas oxyodon*. Backer (1965) observed 3 intergrading forms (f. *javanica*, f. *littoralis* and f. *montana*) from Java.

As a result of observations on a fairly large number of herbarium specimens, all these are seemingly connected by a series of intermediate forms. Variations often occur in the same specimen. Therefore I consider them as belonging to a single but variable species.

5. *Leucas mollissima* Wall. ex Benth. in Wall. Pl. As. Rar. 1 (1830) 62; Benth. Lab. Gen. & Sp. (1834) 607, in DC Prodr. 12 (1848) 525; Hook. f. Fl. Brit. Ind. 4 (1885) 682; Merr. & Rolfe in Philip. J. Sc. (1910) Bot. 381; Merr. Enum. Philip. 3 (1923) 411.

Leucas marrubioides (non Wall.) Ceron Cat. Pl. Herb. Manila (1892) 135.

Leucas sericea Elm. Leaflet. Philip. Bot. 1 (1908) 340.

Annual or perennial herb, 40–60 cm high, much-branched. Stems and branches hoary-tomentose. Leaves thin to thick membranaceous, narrowly ovate to elliptic, 1.5–3 cm long, 1–1.5 cm wide, obtuse or acute, the base rounded, entire, the margins elsewhere crenate or serrate, densely appressed tomentose on both surfaces, the lower often silvery glaucous; petioles 0.2–0.5 cm long. Flowers 6–10 in axillary false whorls, distant; bracts linear, minute. Calyx cylindric, 7–8 mm long, densely sericeous, striate; teeth subulate, subequal. Corolla 14–15 mm long, curved, not annulate; upper lip 3–4 mm long, densely sericeous; lower lip 7–8 mm long, nearly flat. Nutlets broadly ellipsoid, flattened, 1.5 mm long, 1 mm broad, nearly smooth.

Distribution: India to S. China and Malesia.

Ecology: In open places or in thickets, from low to medium altitudes.

Vern. names: Saja-hetela (Sunda), Abra (Philippines).

Specimens examined:

Malay Peninsula: Kedah, G. Baling, summit, *Corner & Nauen 35381* (Sing.); G. Baling, *Kiah s.n.* May 1938 (Sing.) (Fls. white).

Lesser Sunda Islands: Lombok, alt. 500–1,200 m, *Elbert 1420 & 1462* (L); Wetar Isl., *Elbert 4369* (L).

Philippines: Luzon, Baguio, *Elmer 8409* (K) (Type of *Leucas sericea* Elm.); Benguet, *Loher 4183* (K); Luzon, *Loher 4226* (K); Golo, *Merrill 11539* (K, L); Luzon, Benguet, Mt. Santo Tomas, *Merrill 11699* (L); Philippines, *Micholtz s.n.* (K); Mindoro, Mt. Calavite, *Ramos 39388* (L); Luzon, Baguio, *Trono 35164* (L); Panay, Iloilo, Miagas, *Vidal 3468* (K).

Moluccas: Goal, *Idjan 188* (L) (Herb 1 m, high; fls. white).

New Guinea: Papua, Isuarava, *Carr 15343* (K, L).

Ceron (1892) recorded the occurrence of *Leucas marrubioides* in the Philippines which was based on *Vidal 3468* from Panay, Miagas. Here I confirm Merrill's suggestion that the specimen cited is merely a form of *Leucas mollissima* Wall. ex Benth.

One noticeable fact is that according to Benthham's description, the typical form of the species usually has 10–30 flowers in a verticillaster. The Malesian plant, however, usually possesses only 6–10 flowers in a verticillaster.

6. *Leucas flaccida* R. Br. Prodr. (1810) 505; Benth. Lab. Gen. & Sp. (1834) 609, in DC. Prodr. 12 (1848) 526; Miq. Fl. Ind. Bat. (1859) 979; Hook f. Fl. Brit. Ind. 4 (1885) 684; Mukerj. in Rec. Bot. Surv. Ind. 14, 1 (1940) 179.

Leucas parviflora Benth. in Wall. Pl. As. Rar. 1 (1830) 62.

Leucas decemdentata (non Sm.) Benth. Lab. Gen. & Sp. (1834) 609, in DC. Prodr. 12 (1848) 526 (cit. spec. from Timor).

Annual herb, 20–30 cm up to 1 m high, usually flabby and withered. Stems and branches slender, tomentose. Leaves membranaceous, lanceolate to narrowly ovate, 2–3.5 cm long, 1–1.5 cm wide, acute, the base cuneate, entire, the margins elsewhere crenate-serrate, pubescent above, tomentose and subglaucous beneath; petioles 0.5–1 cm long. Flowers 3–8 in axillary whorls, well-apart; bracts linear, 2–3 mm long, setose. Calyx tubular, 5–6 mm long, tomentose, 10-toothed, the teeth subequal, triangular at base, abruptly narrowed above. Corolla 13–14 mm long, the tube long-exserted, annulate within; the lower lip slightly longer than the upper one. Nutlets obovoid, 1.5 mm long, 0.6 mm broad, subtruncate above, smooth.

Distribution: Burma, Malesia (Malay Peninsula, Lesser Sunda Islands, Philippines, Celebes and New Guinea) to N. E. Australia.

Ecology: In dry, open places or on limestone hills at low altitudes.

Vern. names: Bimig-Arial, Daarutuk, Kafi (Sunda Islands).

Specimens examined:

Malay Peninsula: Kedah, G. Baling, alt. 400 m, *Henderson 35381* (K) (Fls. white).

Lesser Sunda Islands: Timor, near Kapan, alt. 900 m, *Bloembergen 3533* (L) (Herb 30 cm. high; fls. white); Wetar, alt. 250 m, *Bloembergen 3641* (L) (Herb 1 m, high; fls. white); Timor Coefang, *Brown s.n.* April 1803 (L); Alor, alt. 400 m, *Jaag 202* (L); Timor, *Meyer s.n.* June 1883 (K); Timor *Teysmann 10930* (L); W. of Timor, Sejra, *Treub s.n.* 1893 (L).

Philippines: Palawan, *Merrill 1269* (L); Sulu, Tawitawi, *Ramos & Edano 44040* (L); Luzon, Laguna, Mt. Maquilang, *Servinas 16898* (L).

Celebes: Pangkadjene, *Eyma 306* (L); Sangi & Talaud Isls., alt. 300 m, *Lam 2402* (L) (Calyx green; fls. white); Pangkadjene, *Teysmann 12268* (L).

New Guinea: N. New Guinea, Humboldt Bay, *Gjellerup 988* (L) (Fls. white scentless).

18. MELISSA LINN.

Melissa [Tourn] Linn. Gen. Pl. ed. 5 (1754) 257; Sp. Pl. (1753) 592; Benth. in Benth. & Hook. f. Gen. Pl. 2 (1876) 1191; Briq. in E. & P. Pfl. Fam. 4, 3a (1897) 295.

Perennial herbs, branched. Leaves opposite, crenate. Flowers medium-sized, usually in few-flowered, axillary false whorls. Calyx always 13-nerved, sometimes not very clear due to the reticulation of transverse veins; 2-lipped; upper lip 3-dentate, the teeth broad and highly connate, often slightly recurved; lower lip 2-toothed, the teeth long and subulate. Corolla rather straight, long and slender; upper lip emarginate or notched, erect; lower lip 3-lobed, flat and spreading. Stamens 4, didynous, ascending, epicorolline, the posterior pair smaller and shorter than the anterior pair; anthers 2-loculate, the locules divaricate. Style lobes subequal. Nutlets obovoid, smooth and dark, often with a very prominent scar.

Species 3, S. Europe and S. & S. E. Asia; 1 species extended to Malesia.

1. *Melissa axillaris* Bakh. f. in Back. & Bakh. f. Fl. Java 2 (1965) 629.

Melissa hirsuta (non Hornem.) Bl. Bijdr. (1826) 830; Benth. Lab. Gen. & Sp. (1834) 394, in DC. Prodr. 12 (1848) 241.

Melissa parviflora (non Salisb. 1796) Benth. in Wall. Pl. As. Rar. 1 (1830) 65, Lab. Gen. & Sp. (1834) 394, in DC. Prodr. 12 (1848) 241; Hook. f. Fl. Brit. Ind. 4 (1885) 651; Miq. Fl. Ind. Bat. 2 (1859) 960; Kudo in Mem. Fac. Sc. Agr. Taihoku Un. 2, 2 (1929) 96; Mukerj. in Rec. Bot. Surv. Ind. 14, 1 (1940) 100.

Geniosporum axillare Benth. in Wall. Pl. As. Rar. 2 (1830) 18.

Erect herb, upto 1 m high, more or less woody at the base. Branches pubescent when young. Leaves thin or thick membranaceous, very variable in size and shape; the small ones ovate or elliptic, 1.2–3 cm long, 0.8–1.5 cm wide, acute, the base rounded or cuneate, the margins crenate; the larger ones lanceolate-ovate, often unequilateral, 5–7 cm long, 2–3 cm wide, acuminate, the

18

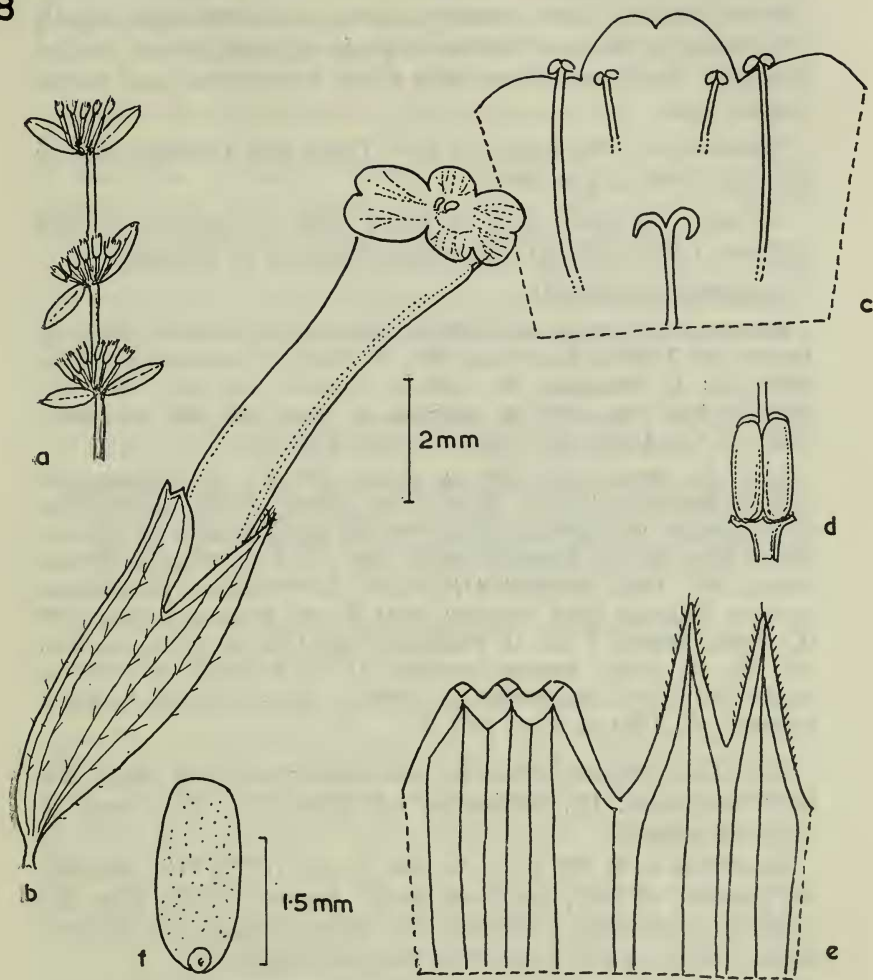


Fig. 18. *Melissa axillaris* Bakh. f.

a. diagram of portion of the inflorescence; b. flower, c. portion of corolla expanded, showing the stamens and tip of style; d. ovary; e. upper portion of fruiting calyx expanded; f. nutlet. (flower, *Backer 21603*; fruit, *Backer 489*).

base acute, the margins remotely toothed except the base; petioles 0.5–3 cm long. Flowers few (usually 4–8) in axillary false whorls; pedicels 1–2 mm long, sericeous. Calyx 5–6 mm (in fruit 6–8 mm) long, pilose on the ribs outside; tube not inflated below; upper lip shortly 3-toothed, often recurved; lower teeth 2, subulate, ciliate. Corolla 9–10 mm long; tube slender; upper lip notched; lower lip 3-lobed. Stamens 4, the anterior pair barely exerted. Style equally 2-branched at the top. Nutlets narrowly ellipsoid, 8 mm long, 2 mm wide, finely puberulent, with a very conspicuous scar on the ventral base.

Distribution: Himalayas, to S.W. China and Formosa, and to Malesia (Sumatra and Java).

Ecology: In open trials or forest edges at medium to high altitudes 1,500–2,600 m), sometimes at the top of volcanoes.

Specimens examined:

Sumatra: G. Kerintji, alt. 2,200 m, *Bünnemeijer 9196* (L, Sing); G. Kerintji, alt. 2,600 m, *Bünnemeijer 9805* (L, Sing.); G. Kerintji, *Bünnemeijer 10266* (L); G. Singalang, alt. 1,200 m, *Matthew s.n.* Dec. 1913 (K); Korinchi Peak, alt. 2,400 m, *Robinson & Kloss 144* (BM, K, Sing.); Gajoe & Alas Lands, alt. 1,500 m, *Steenis 8744* (L).

Java: G. Slamet, alt. 2,500 m, *Backer 489* (L); G. Tjeremai, alt. 1,500 m, *Backer 4914* (L); G. Tjeremai, alt. 2,000 m, *Backer s.n.* 1912 (L); G. Papandajan, alt. 1,800 m, *Backer 5543* (L); Dieng Plateau, alt. 2,000 m, *Backer 21603* (K, L); Tjeremai, *Blume 1589 a & b* (L) (Type of *Melissa hirsuta* Bl.); Java, *Horsfield 111 & 114* (K); Preanger, Pengalangen, *Leeuwen 2351* (L); Tegal, *Leeuwen 13342* (L); W. Patoeha, *Lörzing 1299* (L); Tegal, *Monchy 8* (L); G. Papandajan, alt. 1,700 m, *Ridley s.n.* Feb. 1915 (K) (fls. white); Preanger, *Schiffner 11* (L); Preanger, alt. 2,000 m, *Slooten 764* (K); G. Papandajan, alt. 2,041 m, *Steenis 4273* (K, L, Sing.); Preanger, alt. 2,000 m, *Wisse 1057* (L).

Since both *Melissa hirsuta* Bl. and *Melissa parviflora* Benth. are later homonyms, Dr. Bakhuizen v.d. Brink, Jr.'s new name is therefore accepted.

Merrill (in J. St. Br. Roy. As. Soc. sp. no. (1921) 519) recorded the presence of this plant from Brunei, Borneo. So far, from the available specimens* examined, this species appears to be confined to Sumatra and Java in the Malaysian regions.

Excluded species

Melissa indora Hassk. in Hov. & De Vriese, Tijdschr. Nat. Gesch. & Phys. 10 (1843) 127, Cat. Bogor. (1844) 132; Miq. Fl. Ind. Bat. 2 (1859) 969. — *Teucrium viscidum* Bl.

The reduction was made by Koorders (Exkur. Fl. Java 3 (1912) 142).

* I am indebted to Dr. J. A. R. Anderson and Dr. P. Ashton for sending all the Labiatae specimens in the Herbarium of the Forest Department, Kuching, Sarawak to Singapore. I failed to find any specimen that can be referred to this species.

19. MENTHA LINN.

Mentha (Tourn.) Linn. Gen. Pl. ed. 5 (1754) 257, Sp. Pl. (1753) 592; Benth, in Benth. & Hook. f. Gen. Pl. 2 (1876) 1182; Briq. in E. & P. Pfl. Fam. 4, 3a (1897) 317.

Perennial herbs with creeping rootstocks, often strongly scented. Leaves opposite, often dotted. Flowers small, in axillary false whorls (in Malesian species) or forming terminal spicate inflorescence; bracts often small. Calyx tubular or campanulate, 10-nerved, 5-toothed, the teeth subequal. Corolla funnel-shaped, short, 4-lobed, the uppermost lobe broader than the other 3, emarginate. Stamens 4, dimorphic, subequal; anthers 2-loculate, the locules parallel; filaments free, erect, distant. Disk entire, uniform. Style shortly 2-branched, subequal. Nutlets ovoid, smooth or reticulate.

Species about 25–30*, mainly in North temperate regions of the Old World; with 1 species (*Mentha arvensis* Linn.) introduced and cultivated and 1 variety (or considered as a species) probably native to Malesia.

1. **Mentha arvensis** Linn. var. **javanica** (Bl.) Hook. f. Fl. Brit. Ind. 4 (1885) 648; Back. & Bakh. f. Fl. Java 2 (1965) 631.

Mentha javanica Bl. Bijdr. (1826) 826; Benth. Lab. Gen. & Sp. (1833) 183, in DC. Prodr. 12 (1848) 173; Prain in J. As. Soc. Bengal 74, 2 (1907) 710; Merr. Enum. Philip. 3 (1923) 415; Ridl. Fl. Mal. Pen. 2 (1923) 655 (as *Excl. sp.*)

Mentha arvensis Benth. (*non* Linn.) var. *zollingeri* Briq. in E. & P. Pfl. Fam. 4, 3a (1897) 319.

Herb, prostrate, often rooting below. Stems 30–60 cm high, pubescent with adpressed hairs. Leaves thin membranaceous, lanceolate to broadly lanceolate, 2.5–4.5 cm long, 1–2.5 cm wide, acute, the base long-cuneate, entire; margins elsewhere serrate; sparingly hairy above, glabrous beneath; petioles 0.5–1 cm long. Flowers in axillary false whorls; bracts linear or subulate, 2–4 mm long; pedicels 2–2.5 mm long. Calyx tubular-campanulate, 2.5 mm (in fruit 3 mm) long, adpressed with short and long hairs, 5-toothed; teeth subequal, lanceolate or subulate, ciliate, often shorter than the tube. Corolla 4.5–5 mm long, puberulent externally. Nutlets ellipsoid, 1 mm long, finely granulate, often pointed above, and with a large lateral scar below.

Type specimen: Java, Buitenzorg, et in uliginosis prope Tugu, *Blume s.n.* (L).

*The number of species has been variously estimated. To quote de Wolf (in Bailey, vol. 2, p. 3, 1954), "The genus *Mentha* is taxonomically a most perplexing group of cultivated plants. This situation arises principally from its long history in cultivation and its propensity for hybridization. In the past there has been a tendency by students, as in many similar genera, to recognize every individual variation as a distinct species. This has resulted in an almost hopeless multiplication of names, so that now, in a genus with about 25 species there are more than 600 specific names."

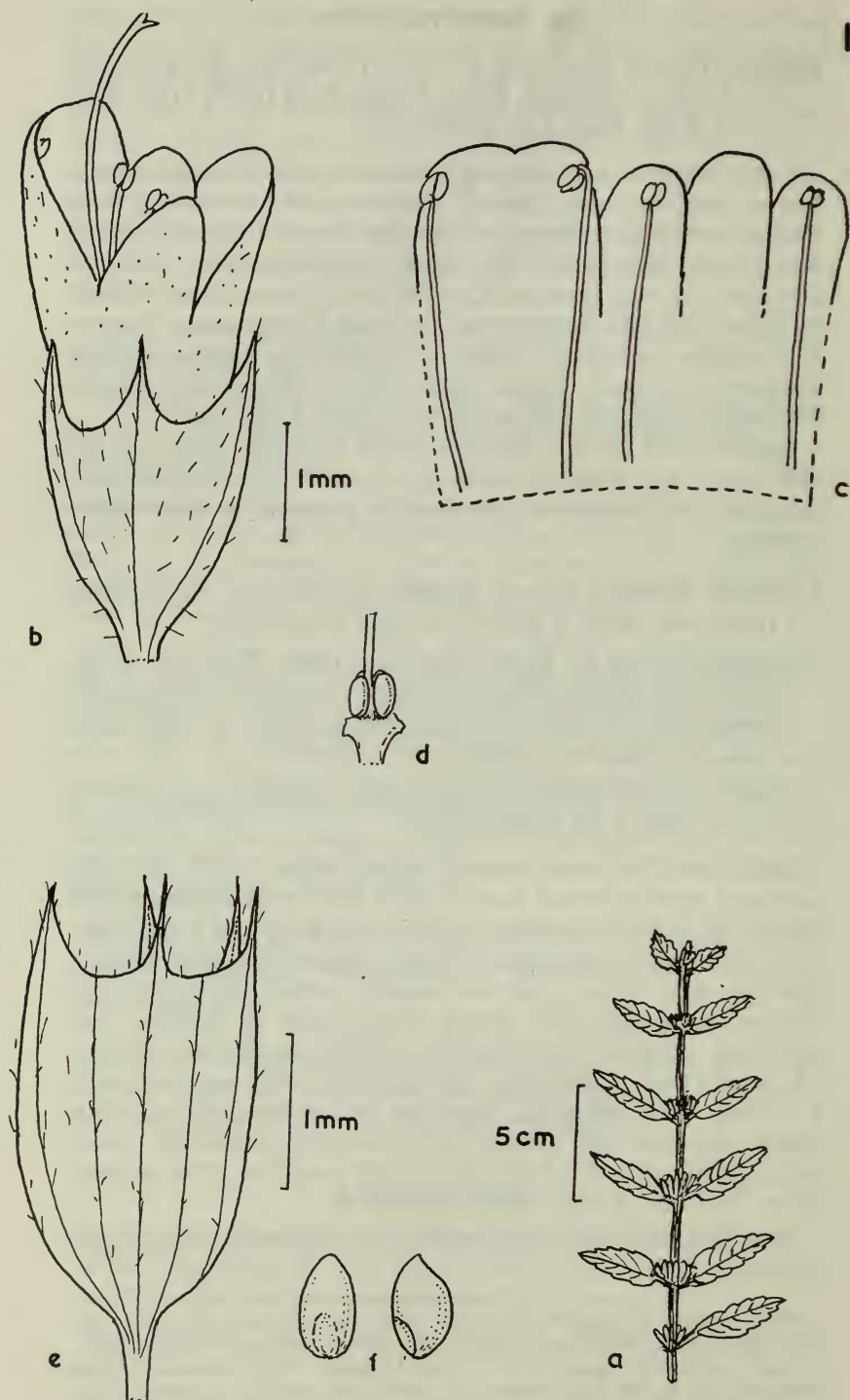


Fig. 19. *Mentha arvensis* Linn. var. *javanica* Hook. f.

a. portion of a branch with axillary verticillasters; b. flower; c. corolla expanded (upper portion only); d. ovary; e. fruiting calyx; f. nutlet in 2 views. (Blume, s.n.)

Distribution: Ceylon and Malesia (Malay Peninsula, Java, & the Philippines).

Ecology: Often cultivated only.

Vern. names: Bidjanguit, Daun poko (Java); Polihos, polio (Philippines).

Specimens examined:

Malay Peninsula: Singapore, Galang, *Bakar s.n.* 1892 (Sing.); Singapore, *Burkill* 276 (Sing.); Singapore, *Furtado s.n.* March 1924 (Sing.); Malacca, *Griffith* 3977 (K).

Java: Buitenzorg, *Bakhuizen v/d Brink* 7901 (K); Java, *Zollinger* 1843 (BM).

Philippines: Philippines, *Cuming* 1718 (K).

This Malesian plant perhaps is not specifically different from the southern European species, *Mentha arvensis* Linn., although it can be easily distinguished from the latter by its lanceolate leaves and by its longer calyx-teeth which often exceed the length of the calyx-tube; while in the typical form of *Mentha arvensis*, the leaves are generally oblong-ovate, and the length of the calyx-teeth never exceeds that of the calyx-tube. Their basic structures of the flower and inflorescence, nevertheless, are very much the same. Kooders (in Exkurs. Fl. Jav. 3 (1912) 150) was of the opinion that they are conspecific.

A large number of specimens of this species from the Malaysian regions are deposited in the Leiden herbarium. I regret that I did not have time to study them during my short stay there.

Cultivated species

Mentha arvensis Linn. Sp. Pl. (1753) 577; Merr. Enum. Philip. 3 (1923) 415.

Mentha crispa (non Linn.) Blanco, Fl. Filip. (1837) 474, ed. 2 (1845) 330, ed. 3, 2 (1878) 246.

A native of Europe, cultivated in the Malesia as a pot plant. Propagated vegetatively.

20. MESONA BL.

Meson Blume Bijdr. (1826) 838; Benth. in Benth. & Hook. f. 2 (1876) 1172; Briq. in E. & P. Pfl. Fam. 4, 3a (1897) 365.

Annual herbs. Stems erect or procumbent, pubescent. Leaves opposite, petiolate. False whorls many flowered, forming axillary and terminal racemose inflorescences; flowers small, bracts often caducous. Calyx campanulate (in fruit tubular, declinate), 8-nerved, 2-lipped, the upper lip 3-fid, the lower entire. Corolla short; throat inflated, abruptly constricted towards the base; limb 2-lipped, the upper lip truncate or 3-lobed, the median lobe very broad, the lower oblong, concave. Stamens 4, in 2 pairs; anther locules confluent into 1-loculate; filaments exserted, those of the posterior pair appendaged at the base. Style briefly 2-fid. Disk inflated, gibbous.

Nutlets ellipsoid or ovoid, minute, smooth; lower part of the fruiting calyx-tube deeply pitted between the nerves and the connecting transverse bars.

Species about 8–10, from the Himalayas, Thailand, Indo-China to S. China, Formosa and Malesia. 2 species are distributed in Malesia.

Key to the species

A. Flowers usually 12–20 in a false whorl; flowering calyx 2–2.5 mm long, lower part of fruiting calyx conspicuously inflated and cross-barred and pitted; leaves and stems often pubescent or densely villous. 1. *M. palustris*

A. Flowers usually over 20 in a false whorl; flowering calyx 2.5–3 mm long; lower part of fruiting calyx not or only slightly inflated, the cross bars and pits less conspicuous; leaves and stems often glabrescent or pubescent. 2. *M. philippinensis*

1. **Mesona palustris** Bl. Bijdr. (1826) 839; Benth. in DC. Prodr. 12 (1848) 46; Miq. Fl. Ind. Bat. 2 (1858) 940, (incl. var. *petiolata*); Back. & Bakh. f. Fl. Java 2 (1965) 638.

An erect, aromatic herb, 30–50 cm high. Stems slender, unbranched or only sparsely branched at the top, glabrescent, pubescent or densely villous. Leaves membranaceous or chartaceous, oblong-elliptic or narrowly obovate-elliptic, 3–8 cm long, 1.2–3.5 cm wide, acute or obtuse, the base narrowly acute or rounded, the margins crenate or serrulate; petioles 0.5–2 cm long, hispid or villous. False whorls close or distant, many- (usually 12–20) flowered, forming terminal, rarely also axillary, raceme-like inflorescence, 5–12 cm long; rachis villous or hirsute; bracts subtending the whorls lanceolate to ovate, 7–10 mm long, acuminate, deciduous; pedicels 5–6 mm long. Calyx campanulate, 2–2.5 mm long, covered with white hairs; limb 2-lipped, the upper lip 3-lobed, ciliate, the lower lip oblong, rounded, often thin and transparent. Corolla 4–5 mm long, the tube inflated above, and abruptly narrowed below. Fruiting calyx tubular-urceolate, 4–5 mm long, the lower part of the tube inflated, deeply reticulate and pitted between the nerves, hirsute. Nutlets ellipsoid, flattened, about 1 mm long, 0.6–0.7 mm wide, finely granulate.

Type specimens: Buitenzorg, Java, *Blume s.n.* (*Herb. Lugd. Bat.* 905, 103–495, & 497).

Distribution: Malesia.

Ecology: In lowland rice fields or on open grassy slopes or in forest margins from low to medium altitudes (75–2,300 m).

Specimens examined:

Java: G. Boender, *Backer s.n.* 1910 (L); Madioen, Patjitan, alt. 420 m, *Backer* 2974 (L); G. Lawoe, alt. 75 m, *Backer* 6727 (L); Java, *Blume s.n.* (L) (Lectotypes of *Mesona palustris* Bl.) (*Herb. Lugd. Bot.* No. 905, 103–495 & 497) Bogor, Tjampea, *Bonsma s.n.* (L); Lawoe, alt. 150 m, *Coert* 1027 (L); Lawoe, *Coert* 1049 (L); Madioen, G. Lawoe, Sarangan, alt. 1,000 & 1,500 m, *Dorgelo s.n.* 1923 (L); Madioen, G. Lawoe, alt. 2,300–2,600 m, *Elbert* 146 (L); Madioen, Ramping, 1,300–1,400 m, *Elbert* 147 (L); Madioen, G. Lawoe, alt. 2,000–2,300 & 2,300–2,600 m,

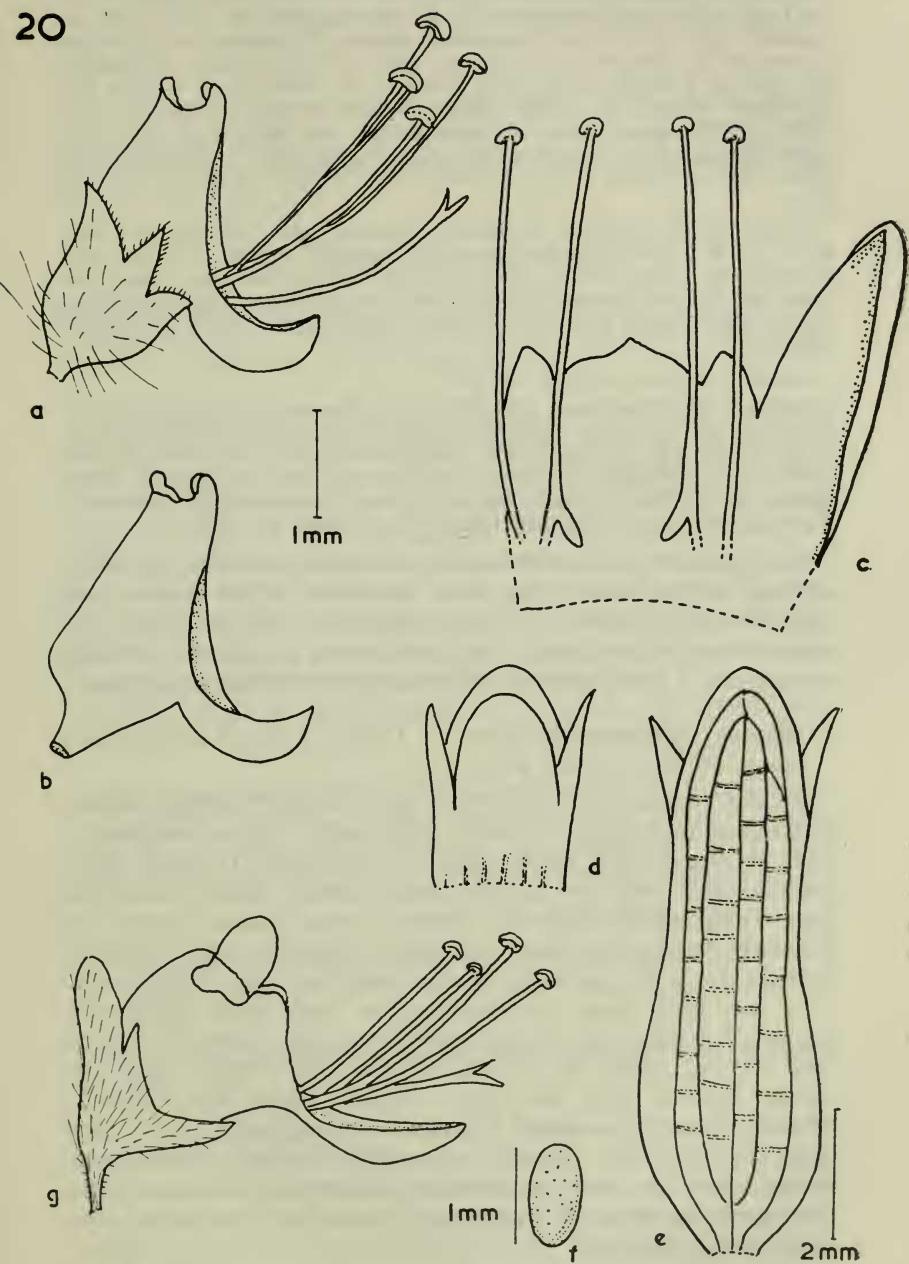


Fig. 20. *Mesona palustris* Bl. (a-f) and *M. philippinensis* Merr. (g).

a. flower; b. corolla; c. corolla expanded, showing the stamens (the upper pair appendaged at the base); d. upper portion of fruiting calyx, seen from below; e. fruiting calyx, seen from above; f. nutlet; g. flower (a-f, Horsfield s.n.; g. Ramos & Edaño 40206).

Elbert 745 & 746 (L); Idjen Plateau, *Geert-Ronner* s.n. 1923 (L); Bogor, cult., *Hallier* 294 (L); Java, *Hoffmannsegg* 117 (K); Java, *Horsfield* lab. 22 (K) (Type of *Mesona palustris* Bl. var. *petiolare* Miq.); Java, *Junghuhn* 13 (K, L) & 14 (L); Java, *Junghuhn* 573 (L); G. Ungarang, alt. 3,000–4,000 m, *Junghuhn* 574 & 576 (L); Madioen, Sarangan, G. Lawoe, alt. 1,300 m, *Karsten* 47 (L); Kertosono, *Kooper* s.n. June 1925 (L); Besoeki, Ridjengan, alt. 1,450 m, *Koorders* 43204 (K, L); Bogor, alt. 260 m, *Nedi* & *Idjan* 203 (L) (height 40 cm; fls. violet); Pasoeroean, G. Boetak, *Oosten* s.n. Nov. 1930 (L); Priangan, Bandoeng, Batoedjadar, alt. 600 m, *Piji* 908 (L); Idjen Plateau, *Rant* s.n. June 1927 (L); Pasoeroean, G. Ardjoeno, alt. 1,600–2,000 m, *Steenis* 7008 (L); Java, *Waitz* s.n. (L); Java, *Zippelius* s.n. (L).

Lesser Sunda Islands: Lombok, Rindjani, alt. 500–700, 750–900, 900–1,350 & 2,200–2,300 m, *Elbert* 747, 884, 973 & 1047 (L); Lombok, Rindjani, alt. 1,175–1,250 m, *Elbert* 1459 (K, L); W. Sumbawa, Semongkat Atas, alt. 700 m, *Kuswata* 183 (L); Bali, alt. 1,250 m, *Steenis* 8157 (L. Sing.); Bali, *Voogd* 1926 (L); Lombok, Poesoek, alt. 1,500 m, *Voogd* 2099 (L).

Borneo: Borneo, *Korthals* s.n. (L).

Celebes: G. Bonthain, alt. 2,000 m, *Bünnmeijer* 72909 (K); G. Bonthain, alt. 1,800 m, *Bünnmeijer* 12274 (L); Sidenreng-Rapang, alt. 75 m, *Eyma* 338 (L) (fls. pink); Pasoei-Rante Lemo, alt. 600–1,300 m, *Eyma* 405 (L); Kanandede-Komba, alt. 900 m, *Eyma* 1157 (L) (fls. lilac); Teleboi, alt. 1,050 m, *Eyma* 1520 (L); Celebes, *Foresten* 38 (L); Enrekang, *Noerkas* 340 (L); G. Sikoekoe, *Vuuren* & *Rachmat* s.n. 1913 (L).

The species is extremely variable in shape, dentation and indumentum of the leaves. The basic structures of the flowers and fruit are very constant. *Mesona parviflora* (Wall.) Briq., (or *Mesona wallichiana* Benth.) of Indo-Burma, as Miquel correctly pointed out, is not specifically different from this Malesian species.

2. ***Mesona philippinensis*** Merr. in Philip. J. Sc. 7 (1912) 101. Enum. Philip. 3 (1923) 420.

An erect annual herb, 30–50 cm high, aromatic. Stems slender, glabrescent or sparingly covered with hairs. Leaves membranaceous or chartaceous, oblong-elliptic, 3–5 cm long, 1.5–2 cm wide, acute on both ends, the margins finely serrate; petioles 2–2.5 cm long. False whorls close or distinct, many- (usually over 20) flowered, forming terminal raceme-like inflorescence, 8–12 cm (in fruit up to 20 cm) long; bracts subtending each whorl ovate, 7–10 mm long, acute to acuminate on both ends, deciduous; pedicels 5–6 mm long. Calyx tubular, sparingly hairy, 2.5–3 mm long, 2-lipped; upper lip 3-lobed, the central lobe larger; lower lip oblong. Corolla 4.5–5 mm long, 2-lipped; upper lip rhomboid, inflated; lower lip oblong. Fruiting calyx cylindrical, 5–5.5 mm long, the lower part curved, only slightly inflated, hirsute and warted; cross-bars and pits between the nerves less conspicuous. Nutlets oblong ellipsoid, compressed, 1 mm long, 0.4 to 0.5 mm wide, finely granulate.

Type specimens: Mt. Data, Lepanto, Luzon, *Merrill* 4500 (isotype, BM, K), Nov. 1905; Bontoc subprov., Luzon, *Father M. Vanoverborgh* 601 (paratype, L), Oct. 1914.

Distribution: Endemic to Malesia (Luzon, Philippines).

Ecology: On grassy slopes in thin pine forests, alt. 1,300–2,000 m.

Specimens examined:

Philippines: Benguet, Data, *Loher 4200 & 4201* (K); Luzon, Lepanto, Mt. Data, *Merrill 4500* (BM, K) (Type of *Mesona philippinensis* Merr.); Luzon, Lepanto, Mt. Data, *Ramos & Edano 40206* (L); Luzon, Cagayan, Penablanca, *Ramos 76847* (Sing.); Luzon, Bontoc, *Vanoverbergh 601* (L) (Paratype).

This species with a pair of small lateral teeth in the upper calyx-lip, and with less conspicuously cross-barred and pitted fruiting calyx is somewhat intermediate between *Masona* Blume and *Nosema* Prain.

21. MICROTOENA PRAIN.

Microtoena Prain in Hook. Ic. Pl. 19 (1889) *t. 1872*; in J. As. Soc. Beng. 59 (1890) 310, in Bull. Soc. Bot. Fr. 42 (1895) 417; Briq. in E. & P. Pfl. Fam. 4, 3a (1897) 269.

Perennial herbs, erect and branching. Leaves opposite, long-petiolate. Flowers in large terminal panicles and smaller axillary cymes. Calyx campanulate, accrescent in fruit, unequally 5-toothed, obscurely 10-nerved; throat glabrous within. Corolla-tube long exserted, 2-lipped; upper lip galeate, concave, entire; lower lip spreading, 3-fid, the mid-lobe much narrower than the lateral ones. Stamens 4, in 2 pairs, ascending under the upper lip; anther-locules divaricate when young, at length confluent; filaments often hirsute. Style bifid, the upper branch very short. Nutlets minute, ovate, the ventral surface subtriquetrous, smooth or granulate.

Species about 6, Indo-Himalaya, S. China and Indo-China; 1 extended to Malesia (Java).

1. *Microtoena insuavis* (Hance) Prain ex Briq. in E. P., Pfl. Fam. 4, 3a (1897) 269; Dunn in Not. Roy. Bot. Gard. Edinb. 6 (1915) 188; Kudo in Mem. Fac. Sc. & Agr. II, 2 (1929) 183; Wu in Act. Phytotax. 8 (1959) 44; Back. & Bakh. f. Fl. Java 2 (1965) 625.

Gomphosium insuave Hance in J. Bot. 22 (1884) 231.

Microtoena cymosa Prain in Hook. Ic. Pl. 19 (1889) *t. 1872*, in J. As. Soc. Beng. 59 (1890) 310, in Kew Bull. Misc. Inf. (1902) 11.

Peranthus patchouli Clarke in Hook. f. Fl. Brit. Ind. 4 (1885) 624.

Erect branching herb, 0.5–1 m high. Stems and branches densely villose. Leaves chartaceous, ovate to broadly ovate, 7–10 cm long, 4.5–7.5 cm wide (sometimes much smaller), acute, the base rounded or subcordate, often abruptly cuneate, the margins serrate or crenate-serrate; adpressedly pubescent on both surfaces; petioles slender, 1–7 cm long. Flowers in lax, terminal and axillary cymes, usually forming large paniculate thyrses, up to 15 cm high. Calyx turbinate, 3–4 mm (in fruit 6–7 mm) long hirsute and glandulate; teeth triangular, subequal, the uppermost one the largest. Corolla 15–16 mm long, pubescent; upper lip hooded; lower lip shallowly 3-fid, the central lobe narrowly elliptic, laterally spreading. Nutlets ovoid, flattened, 1.5 mm long, 1 mm wide, finely granulate.

21

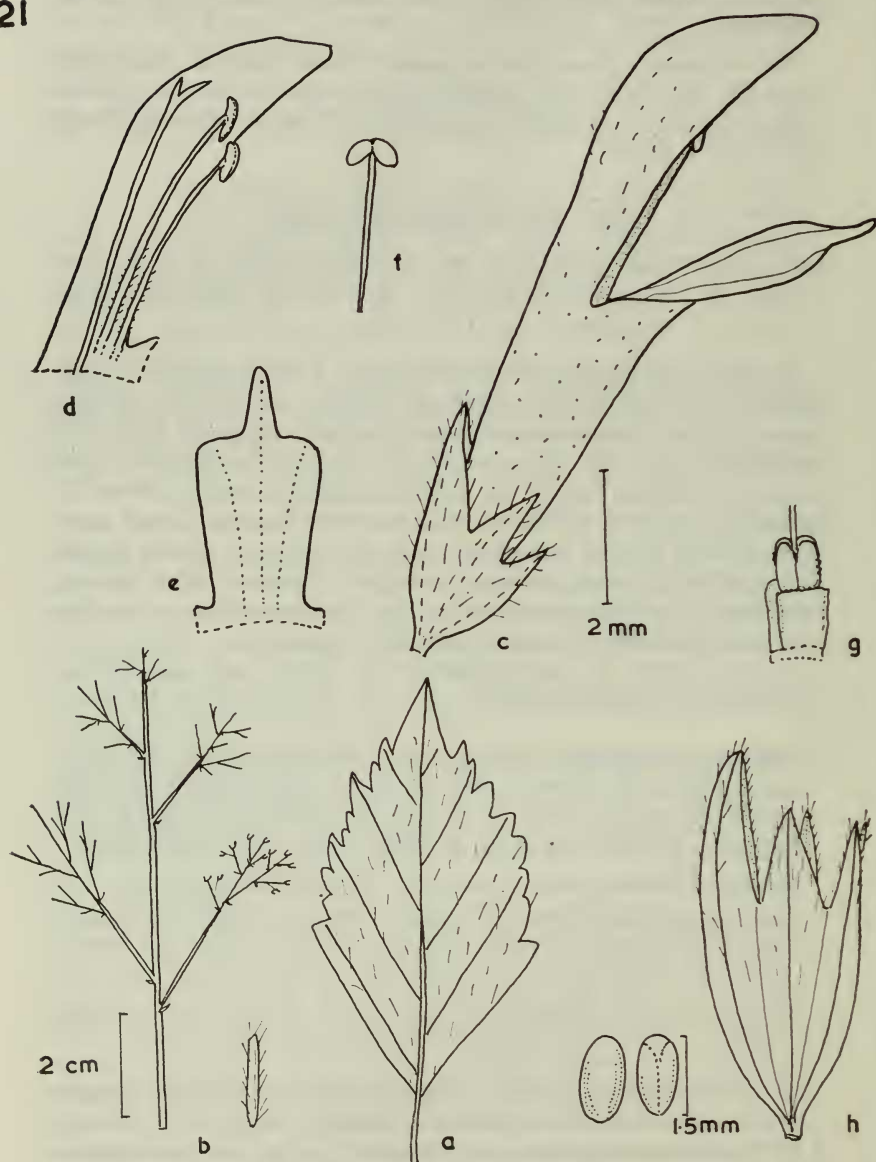


Fig. 21. *Microtoena insuavis* Prain ex Briq.

a. leaf; b. diagram of the paniculate inflorescence and a bract (enlarged); c. flower; d. half upper lip of corolla (upper portion only); e. lower lip of corolla; f. stamen; g. ovary and nectary disc; h. fruiting calyx and nutlet (a & b. Rant s.n.; c-h. Koorders 23161).

Type specimen: N. River, Kwangtung, S. China, *Henry* 22237. (type of *Gomphostemma insuave* Hance, not seen).

Distribution: E. India, Burma, Indo-China to S. China and Malesia (Sumatra, Java, the Lesser Sunda Islands & New Guinea).

Specimens examined:

Sumatra: Keban Djahe, East Coast, *Hamel & Si Toroes* 689 (L); Berastagi, *Ridley s.n.* (Feb. 1921) (K).

Java: E. Java *Coert* 1071 (L); G. Oengaran, C. Java, *D.v. Leeuwen* 2187 (L); G. Tjaksa, Preanger, *D. v. Leeuwen* 2327 (L); Ngebel, E. Java, *Koorders* 23161 (K, L); Res. Madioen, E. Java, *Koorders* 29140 (L); Ngebel, alt. 883 m, *Rant s.n.* (1922) (L); Idjen, E. Java, alt. 1,300 m, *Rant s.n.* (1927) (L); Preanger, *Winckel s.n.* (Aug. 1917) (L).

Lesser Sunda Islands: Bali, alt. 1,250–1,300 m, *v. Steenis* 8132 (K); Batoe Kaue, Bali, *De Voogd* 1853 (L).

New Guinea: North vicinity of Rigo, C. Dist. Papua, in eucalyptus Savannah, alt. 330 m, *Schodde* 2700 (L) (erect perennial, c. 1.5 m, high, leaves mid dull green above, paler below; corolla mid lavender with dark reddish lines inside).

The Malesian plant agrees fairly well with the type specimens of *Microtoena cymosa* Prain which was described from a cultivated plant (in Mr. Mann's garden, in 1887 and 1888) that originated from Khasia Hills, E. India. These specimens are preserved in the Kew Herbarium.

This binomial was reduced by Dunn as synonymous with *Microtoena insuvavis* (Hance) Prain ex Briq. (Basionym: *Gomphostemma insuave* Hance). The latter was based on *Henry* 22237, from North River, Kwangtung, S. China, which I have not seen. Several specimens deposited in the Kew Herbarium, collected by Ford and others from or near the type locality identified as *Microtoena insuavis* (Hance) Prain ex Briq. by Dunn, however, possess somewhat larger flowers and leaves, and much lax inflorescences.

Only a single specimen from New Guinea (Papua) has been seen. It differs from the typical form of the species in the narrowly ovate (rather than ovate to broadly ovate) leaves, and in the subequal (rather than the posterior one being the largest) calyx-lobes. This probably represents a new variety.

22. MOSLA BUCH.-HAM. ex MAXIM.

Mosla Buch.-Ham. ex Benth. in Wall. Pl. As. Rar. 1 (1830) 66, in Syn.; Maxim. in Bull. Acad. St. Petersb. 20 (1875) 457; Benth. in Benth. & Hook. f. Gen. Pl. 2 (1876) 1182; Briq. in E. & P. Pfl. Fam. 4, 3a (1897) 326.

Orthodon Benth. ex Oliv. in J. Linn. Soc. 9 (1865) 167. (*Orthodon* Schwaeg.)

Hedeoma Pers. sect. *Mosla* Benth. Lab. Gen. & Sp. (1832-36) 366.

Annual herbs, aromatic. Leaves opposite, petiolate. False whorls 2-flowered, secund, in terminal or axillary raceme-like inflorescence; bracts minute or the lower ones large and leafy. Calyx campanulate, 10-nerved, often gibbous at the base, subequally 5-toothed and 2-lipped; upper lip 3-toothed (in Malesian species),

shorter; lower lip 2-toothed, generally slightly longer; throat of calyx pubescent. Corolla exserted; lips short, the upper lip notched, the lower 3-fid. Stamens 4, only the upper pair perfect; anthers 2-loculated, the locules divaricate; the lower pair abortive, present or absent. Disk glandular, produced in the front. Style deeply bifid. Nutlets globose, reticulate (in Malesian species).

Species about 10, throughout S. E. Asia; 2 species in Malesia.

Key to the species

A. Leaves rhomboid to ovate, 1–2 by 0.5–1 cm; upper lip of calyx shallowly 3-toothed, the teeth deltoid. 1. *M. dianthera*

A. Leaves ovate to oblong-ovate, 2–2.5 by 0.8–1 cm; upper lip of calyx deeply 3-toothed, the teeth lanceolate. 2. *M. formosana*

Orthodon Benth. ex Oliver (1865) is a later homonym of *Orthodon* Schwaeg. (1823), a moss genus. Therefore, *Mosla* Buch.-Hamilton, though only validly published by Maximowicz in 1875, is still the legitimate name of the genus.

1. *Mosla dianthera* (Buch.-Ham.) Maxim. in Bull. Acad. Petersb. 20 (1875) 457; Hook. f. Fl. Brit. Ind. 4 (1885) 647; Briq. in E. & P. Ffl. Fam. 4, 3a (1897) 326, f. 98 E.

Lycopus dianthera Buch.-Ham. in Roxb. Fl. Ind. ed. 1, 1 (1820) 145.

Mosla ocimoides Buch.-Ham. ex Benth. in Wall. Pl. As. Rar. 1 (1830) 66; Mukerj. in Rec. Bot. Surv. Ind. 14, (1940) 101.

Cunila nepalensis Don, Prodr. Fl. Nep. (1825) 107.

Hedeoma nepalensis (Don) Benth. Lab. Gen. & Sp. (1834) 366, in DC. Prodr. 12 (1848) 244.

Erect aromatic herb, 30–100 cm high. Stems branched, sparsely pubescent, often woody at the base. Leaves membranaceous, rhomboid or ovate, 1–2 cm long, 0.5–1 cm wide, acute, the base acute or cuneate; margins few-toothed; glabrous above, often glandulate beneath; petioles 0.2–0.5 cm long, pubescent. Panicle inflorescence terminal, often profusely branched, 10–30 cm long, the branches 4–15 cm long, lax-flowered; bracts lanceolate, often minute, 1–2 mm long, subtending the flowers. Calyx campanulate, 2–2.5 mm (in fruiting 4–5 mm) long; throat pubescent with a ring of hairs; teeth deltoid, the lower two teeth longer than the upper ones. Corolla 3–3.5 mm long, 2 fertile stamens slightly shorter than the upper corolla-lobe; 2 staminodes generally absent. Nutlets ellipsoid, 1 mm long, 0.7 mm broad, brown, reticulate.

Distribution: E. India, Burma, Indo-china to S. W. China, S. Japan, Formosa and Malesia (Sumatra).

Ecology: In valleys or open places along trails; altitudes 1,000–1,250 m.

Specimens examined:

Sumatra: Habinsaran, Bartlett 7761 (L); Habinsaran, alt. 1,200–1,250 m, Lörzing 6522 (K, L); Asahan Valley, alt. 1,000 m, Lörzing 9979 (L); Tapianoeli, Toba, Rahmat Si Boeca 9815 (L).

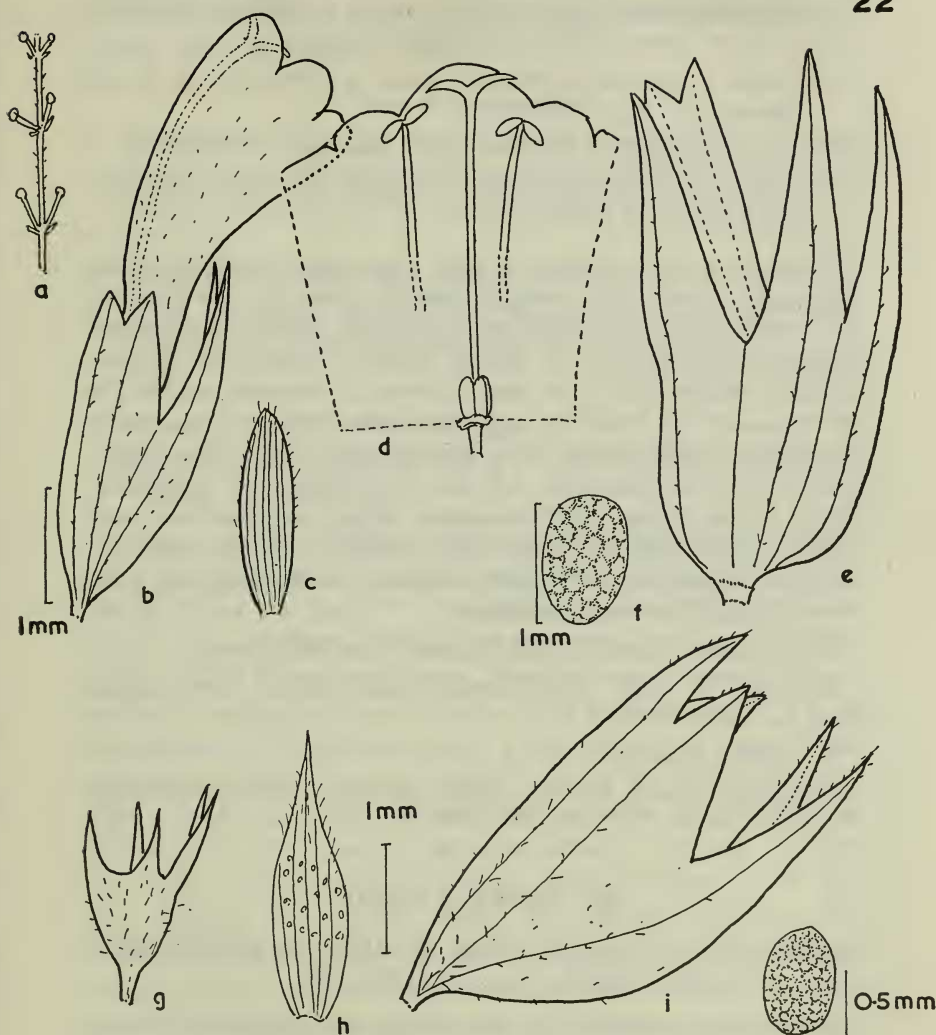


Fig. 22. *Mosla dianthera* Maxim. (a-f) and *M. formosana* Maxim. (g-i).
 a. diagram of portion of inflorescence; b. flower; c. bract; d. corolla expanded, showing 2 fertile stamens; e. fruiting calyx; f. nutlet; g. calyx; h. bract; i. fruiting calyx and nutlet. (a-f, Lörzing w9979); g-i. Ramos and Edano 37803).

The Malesian plant differs from the typical form of the species from India in the much smaller leaves (1–2 by 0.5–1 cm) and in the completely disappearance of the anterior staminodes. In Indian plant, the leaves are usually 1.5–3.5 cm long and 1–2 cm wide, and the two anterior staminodes normally are present.

2. *Mosla formosana* Maxim. in Bull. Acad. St. Petersburg. 20 (1875) 459; Merr. Enum. Philip. Fl. Pl. 3 (1925) 414.

Orthodon formosanum (Maxim.) Kudo in Mem. Fac. Sc. & Ag. Taihoku Un. 2, 2 (1929) 79.

Mosla lysimachiiflora Hayata, Ic. Pl. Formos. 8 (1919) 104.

Orthodon lysimachiiflorus (Hay.) Masam. in Trans. Nat. Hist. Soc. Formos. 22 (1932) 232.

Small erect herb, 20–100 cm high. Stems and branches grayish, pubescent. Leaves thin membranaceous, ovate to oblong-ovate, 2–2.5 cm long, 0.8–1 cm wide, acute, the base cuneate or attenuate; margins crenate-serrate or sharply serrate, glabrescent on both surfaces; petioles 0.5–1 cm long. Flowers in terminal raceme-like inflorescences on branches and branchlets, 3–4 cm long; bracts lanceolate, slightly longer than the flowering buds, often gland-dotted. Calyx campanulate, 1.5 mm (in fruiting, 4–5 mm) long, hirsute on the nerves; teeth lanceolate, ciliate, the lower two teeth slightly longer than the upper ones. Corolla 3–4 mm. long, not annulate. Nutlets ovoid to nearly rounded, 0.8 mm long and wide, brown, slightly flattened, reticulate.

Distribution: Formosa and Malesia (The Philippines).

Ecology: In open places along trails, and on forest edges, altitudes 1,000–1,600 m.

Specimens examined:

Philippines: Bontoc, Mt. Polis, *Ramos & Edano* 37726 (BM); Bontoc, Mt. Pukis, *Ramos & Edano* 37803 (BM, K, L).

23. NOSEMA PRAIN

Nosema Prain in J. As. Soc. Beng. 73 (1904) 20; Kudo in Mem. Fac. Sc. & Agr. Taihoku Un. 2, 2 (1929) 108.

Erect herbs, branched or not. Stems and branches slender, pubescent. Leaves opposite, petiolate. False whorls many flowered, forming terminal cylindric racemose inflorescence, continuous or interrupted below; flowers small; bracts leafy below, gradually diminishing in size upwards. Calyx obliquely ovoid (in fruit tubular), 10-nerved, 2-lipped, the upper lip oblong, entire or very inconspicuous, 3-lobed, the lower round, entire, much shorter than the upper lip. Corolla short; throat inflated, abruptly constricted towards the base; limb 2-lipped, the upper lip slightly shorter, unequally 3-lobed, the median lobe often very broad; lower lip oblong, entire, concave. Stamens 4, in two pairs, declinate; anther-loculate confluent into 1-loculate; filaments pubescent, those of

the upper pair appendaged at the base. Nutlets ovoid, minute, smooth; fruiting calyx-tube flattened cylindric, transverse veins connecting the longitudinal nerves though present, but inconspicuous, not deeply pitted.

Over 6 species have been described from India to Thailand, Indo-China, S. China (Kwangtung and Hainan). The following 2 species occur in Malesia.

Key to the species

- A. Inflorescence 12–15 cm long; false whorls generally 0.5–1.5 cm apart; upper corolla-lip very unequally 3-lobed; fruiting calyx thick coriaceous, pitcher-shaped, inflated in the middle, 6.5–7 mm long. 1. *N. clausa*
- A. Inflorescence 6–8 cm long; false whorls more or less continuous; upper corolla-lip equally 3-lobed; fruiting calyx herbaceous, tubular, not or only slightly inflated in the middle, 8–8.5 mm long. 2. *N. cochinchinense*

1. *Nosema clausa* (Merr.) comb. nov.

Masona clausa Merr. in Philip. J. Sc. 7 (1912) 345, Enum. Philip. 3 (1923) 420.

An erect unbranched herb, 20–30 cm high. Stems densely covered with villose hairs. Leaves chartaceous, oblong or narrowly oblong, 4.5–6 cm long, 1–2 cm wide, acute or obtuse, the base acute, velvet on both surfaces, lateral nerves 7–8 on each side; petioles 0.5–1.5 cm long, velvet. Spurious spike terminal, 12–15 cm long, interrupted; false whorls 12–20 flowered, about 1.5 cm in diameter, 2–2.5 cm apart; bracts 2 subtending each whorl, ovate, acuminate, 0.5–1.5 cm long, densely villous, the lowermost ones almost foliaceous. Calyx obliquely campanulate, 2.5–3 mm long, densely hairy, the upper lip lanceolate-oblong, obscurely 3-lobed; the lower truncate-rounded. Corolla trumpet-shaped, 3.5–4 mm long, inflated from middle above, and abruptly narrowed into a small tube below; upper lip shortly 3-lobed, the mid-lobe much larger than the 2 lateral ones; lower lip entire, concave. Stamens in 2 pairs, the upper pair pubescent and appendaged at the base. Fruiting calyx thick coriaceous, pitcher-shaped, 7–8 mm long, slightly inflated in the middle, the mouth nearly closed by the lid-like lower lip. Nutlets ellipsoid, 1 mm long, smooth.

Type: Culion Island, the Philippines, Merrill 460 (K, Sing. iso-type) Dec. 13, 1903.

Distribution: Malesia (The Philippines).

Habitats: In open, damp places at low altitudes.

Specimens examined:

Philippines: Culion Island, Merrill 460 (K, Sing. type), Ramos 41313 (L).

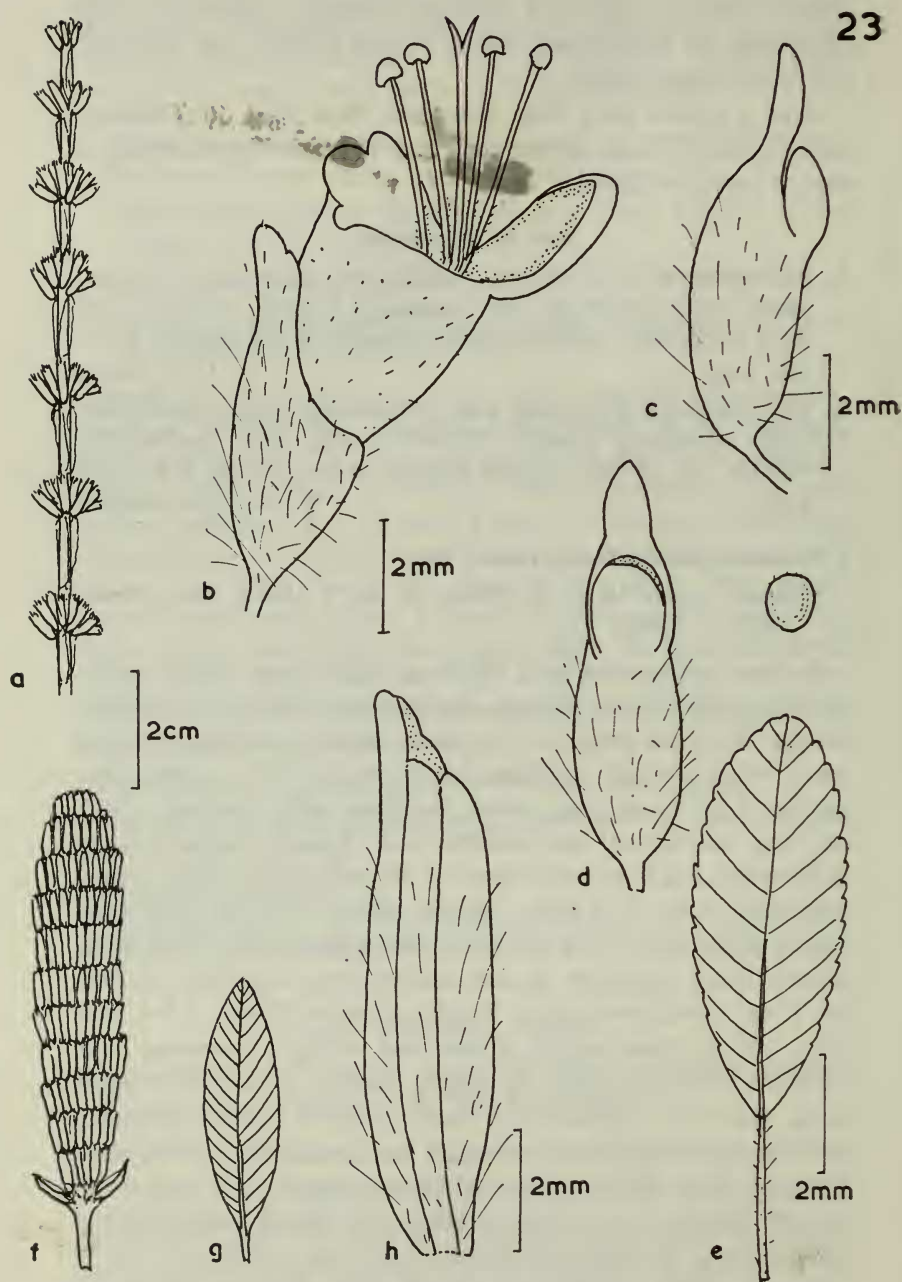


Fig. 23. *Nosema clausa* (Merr.) H. Keng (a-e) and *N. cochinchinense* Merr. (f-h).

a. diagram of the spicate inflorescence; b. flower; c. & d. fruiting calyx in lateral and ventral views, and a nutlet; e. leaf; f. diagram of inflorescence; g. leaf; h. fruiting calyx, in lateral view. (a-e. Merrill 460; f-h. Junghuhn 51).

2. *Nosema cochinchinense* (Lour.) Merr. in Trans. Amer. Philos. Soc. n.s. 24 (1935) 343; Wu in Act. Phytotax. 8 (1959) 62.

Dracocephalum cochinchinense Lour. Fl. Coch. (1790) 371; ed. Willd. (1793) 450.

Mesona prunelloides Hemsl. in J. Linn. Soc. Bot. 26 (1890) 267.

Nosema prunelloides (Hemsl.) C. B. Clarke ex Prain in J. As. Soc. Beng. 73 (1904) 21.

Nosema capitatum (Hemsl.) C. B. Clarke ex Prain var. *javanica* C. B. Clarke ex Prain in op. cit. 73 (1904) 21, *in adnot.*

An erect herb, about 30–50 cm high, sparingly branched. Stems obscurely angled, densely covered with villous hairs. Leaves chartaceous, oblong or narrowly oblong, 4–6 cm long, 1–1.5 cm wide, both ends acute or obtuse, the margins crenulate, sparsely villous on both surfaces; petioles 0.5–1(–2) cm long. Inflorescence terminal, 6–8 cm long; false whorls almost continuous; bracts subtending the lowermost whorls similar to the foliage leaves but smaller, densely villous. Calyx obliquely campanulate, 2.5–3 mm long, densely hairy; upper lip shallowly 3-lobed; lower lip much shorter than the upper, emarginate or notched in the middle, densely covered with long hairs externally. Corolla campanulate, 3–4 mm long; upper lip shortly 3-lobed, the lobes more or less equal in size; lower lip oblong, entire, concave. Stamens in 2 pairs, the upper pair puberulent and appendaged at the base. Fruiting calyx herbaceous, tubular, 8–8.5 mm long. Nutlets minute, about 1 mm long, smooth.

Distribution: Siam, Indo-China to S. China (Kwantung, Hainan) and Malesia (Sumatra, Java).

Specimens examined:

Sumatra: Toba, C. D. Duwachond 83 (L, type of *Achocephalus sumatranus* Backer in sched., unpublished).

Java: Junghuhn no. 13, no 14 (L), no. 8, no 51 (K, types of *Nosema capitatum* var. *javanicum* Clarke ex Prain).

24. OCIMUM LINN.

Ocimum Linn. Sp. Pl. (1753) 833; Benth. Lab. Gen. & Sp. (1832) 1 (as *Ocymum*), in Benth. & Hook. f. Gen. Pl. 2 (1876) 1171; Briq. in E. & P. Pfl. Fam. 4, 3a (1897) 369; Furtado in Gard. Bull. Str. Settl. 4 (1929) 416.

Becium Lindl. in Bot. Reg. (1842) misc. 43.

Herbs or undershrubs, strongly scented. Stems often much-branched. Leaves opposite, petiolate. Flowers small; false whorls 6–10-flowered, forming racemose inflorescence, simple or branched; pedicels recurved under the calyx; bracts minute, caducous. Calyx ovoid or campanulate (in fruit deflexed), 2-lipped; upper lip large, broad, flat (in fruit strongly reflexed), often decurrent on the tube; lower lip usually with 4 narrow, pointed teeth. Corolla campanulate, not annulate within, 2-lipped; upper lip truncate, subequally 4-fid; lower lip declinate, flat, entire. Stamens 4, declinate, in 2 pairs, exserted; filaments free (in Malesian species) or the lower

pair connate below, naked or the upper pair toothed or hairy below; anther-locules confluent. Disk entire or 2-4-lobed. Style 2-fid; branches subulate or flattened. Nutlets smooth or subrugose, in some species mucilaginous when moistened.

Species over 100, throughout the tropics. 4 species in Malasia.

Key to the species

- A. Pedicels much shorter than calyx, the latter glabrous or hairy within.
 - B. Calyx hairy within; 2 lower calyx teeth slightly longer than the upper tooth; fruiting pedicels strongly recurved; herbs or undershrubs.
 - C. Corolla 4-6 mm long; fruiting calyx 2.5-3 mm long, hairy and setaceous. 1. *O. americanum*
 - C. Corolla 7.5-12 mm long; fruiting calyx 5-6 mm long, often glabrous. 2. *O. basilicum*
 - B. Calyx glabrous within; lower calyx-teeth shorter than the upper one; fruiting pedicels straight; shrubby. 3. *O. gratissimum*
- A. Pedicels nearly as long as calyx, the latter glabrous within; 2 lower calyx-teeth longer than the upper tooth, soft hairy. 4. *O. sanctum*

1. ***Ocimum americanum*** Linn. Cent. Pl. 1 (1755) 15, Amoen. Acad. 4 (1759) 276; Back. & Bakh. f. Fl. Java 2 (1965) 640. (*non*. Jacq. 1798).

Ocimum canum Sims, in Bot. Mag. 51 (1823) pl. 2452; Benth. Lab. Gen. & Sp. (1832) 3, 707, in DC. Prodr. 12 (1848) 32; Miq. Fl. Ind. Bat. 2 (1859) 936; Hook. f. Fl. Brit. Ind. 4 (1885) 607; Kudo in Mem. Fac. Sc. & Ag. 2, 2 (1929) 113; Mukerj. in Rec. Bot. Surv. Ind. 14, 1 (1940) 17.

Ocimum africanum Lour. Fl. Cochinch. (1790) 370 (as *Ocymum*); Merr. in Trans. Amer. Phil. Soc. 24, 2 (1935) 343.

Ocimum brachiatum Bl. Bijdr. (1826) 833. (as *Ocymum*).

Erect herb, 30-50 cm high, branched. Stems and branches striate, pubescent or glabrescent. Leaves lanceolate to elliptic, 2.5-5 cm long, 0.9-2.5 cm wide, acute, the base cuneate, the margins entire or remotely crenulate, glabrous and glandular-dotted on both surfaces; petiole 1-2.5 cm long. False whorls in raceme-like inflorescence, terminal, simple or branched, 7-15 cm long; bracts elliptic-lanceolate, 2-3(-5) mm long, acuminate, hairy; pedicels subsessile. Calyx 2-2.5 mm (in fruit 4-4.5 mm) long, villous within, pubescent with long, white hairs externally; uppermost tooth broad and rounded, ciliate; lower teeth lanceolate-subulate. Corolla 5-6 mm long, glabrescent or puberulous. Filaments exserted, slender, the upper ones toothed above the base. Nutlets narrowly ellipsoid, 1.2 mm long, punctate, black.

Distribution: Tropical Africa, India, Ceylon to S. China, and Malesia.

Ecology: In settled areas or in open waste places at low altitudes.

Vern. names: Kamangi, Theru Neetu Patchai (Malay Peninsula).

Specimens examined:

Sumatra: Sumatra, *Korthals s.n.* (L); Batoe Isls., *Raap 575* (L); Sumatra, *Collector Unknown s.n.* (L).

Malay Peninsula: Perak Temoh, *Burkill & Haniff 13510* (Sing.); Kedah, Langkawi, *Curtis 2492* (Sing.); Singapore, *Hamilton s.n.* 1926 (Sing.); Kuala Kangsar, Istana Garden, *Haniff 14930* (Sing.); Perak, Sungkai, Lima Blas Estate, *Reed s.n.* 1941 (Sing.).

Java: Java, *Backer s.n.* 1902 (L); Bantam, alt. 300 m, *Backer 7406* (L); Batavia, *Blume s.n.* (L) (Type of *Ocimum brachiatum* Bl.) (several collections); Tanjong Priok, *Kuhl & Hasselt s.n.* (L); Anjer, *Collector Unknown s.n.* Aug. 1930 (L).

Lesser Sunda Islands: Lombok, Rindjani, alt. 0–20 m, *Elbert s.n.* April 1909 (L).

New Guinea: Papua, Veiya alt. sea level, *Carr 11606* (L); Kaiser Wilhelmsland, *Weinlan 207* (L).

Type specimen of Blume's *Ocimum brachiatum* has been studied, it is identical with *Ocimum americanum* (= *O. canum* Sim.) thus confirming Miquel's (1859, p. 936) earlier suggestion that the former is synonymous with the latter.

2. ***Ocimum basilicum*** Linn. Sp. Pl. (1753) 833; Benth. Lab. Gen. & Sp. (1832) 4, in DC. Prodr. 12 (1848) 32 (incl. var. *glabratum*) Miq. Fl. Ind. Bat. 2 (1858) 937; Hook. f. Fl. Brit. Ind. 4 (1885) 608; Prain in J. As. Soc. Beng. 74, 2 (1907) 702; Merr. Enum. Philip. 3 (1923) 421; Ridl. Fl. Mal. Pen. 2 (1923) 643; Kudo, Mem. Fac. Sc. Agr. Taihoku Un. 2, 2 (1929) 113; Back. & Bakh. f. Fl. Java 2 (1965) 639.

Ocimum americanum (non Linn.) Blanco, Fl. Filip. (1837) 480, ed. 2 (1845) 335.

Ocimum citriodorum Blanco, Fl. Filip. ed. 2 (1845) 591.

An erect branching herb, 0.5–1 m high. Stem and branches glabrous or hispidly hairy when young. Leaves membranaceous, ovate or elliptic-ovate, 3–5 cm long, 1.2–2 cm wide, acute, the base cuneate, entire, the margins elsewhere entire or few-toothed, glabrescent or hairy; petioles 1–2 cm long. False whorls many-flowered, in simple or branched racemes, 10–15 (or more) cm long; bracts lanceolate-ovate, 2–3 mm long; pedicels very short. Calyx 2–3 mm (in fruit 5–6 mm) long; upper lip suborbicular; lower lip with central pair of teeth longer than the upper lip, sharply pointed. Corolla 7–12 mm long, glabrous or hispidous. Filaments exserted; the upper ones with a tooth above the base. Nutlets ellipsoid, 1.5 mm long, pitted.

Distribution: Throughout the Old Tropics.

Ecology: In settled areas or in open waste places at low and medium altitudes, also commonly cultivated.

Vern. names: Kemangi, Selasih (Java); Roedang, Koelasa Koling, Roedangna lopak, Selang-bano, Roedangna birong (Sumatra); Selasih (Malay Peninsula); Bawingsulug, Glontud, Sag bu, solasi (Philippines).

Specimens examined:

Sumatra: Simaloer, *Achmad* 309 (L); Gajo & Alas Lands, *Daalen* 217 (L); Sumatra, *Korthals s.n.* (L); Palembang, *Practorius* 28 (L); Kota Pinang, Laboeban Batoe, *Rahmat Si Toroes* 3654 (L); Asahan, *Rahmat alias Bidin* 6 & 74 (L).

Malay Peninsula: Perak, Ipoh, *Allen* 4792 (Sing.); Penang, Lanyong Tokong, *Curtis* 2492 (Sing.); Pahang, P. Tiomon, Telok Paya, *Henderson* 18428 (Sing.); Perak, Irik Estate, *Milsum s.n.* 1929 (Sing.); Tampin, alt. 1 m, *Monod de Froideville* 664 (L); Perak, Sungkai, *Reed s.n.* 1914 (Sing.); Pahang, Kuala Taulelin, *Ridley s.n.* 1891 (Sing.); Singapore, P. Ayer Merbau, Kampong Ayer Merbau, *Sinclair s.n.* Aug. 1949 (L); Johore, Kota Tinggi, *Teruya* 334 (Sing.); Penang, *Wallich s.n.* 1829 (K) (Type of *Ocimum basilicum* var. *glabratum* Benth.).

Java: Java, *Backer s.n.* 1902 (L); Kendal, alt. 5 m, *Backer* 16468 (L); Madoera, Sampang, alt. 50 m, *Backer* 19610 (L); Madoera, Rapa, alt. 125 m, *Backer* 20091 (L); Madoera, Tamberoe, alt. 10 m, *Backer* 20547 (L); Besoeki, *Backer* 36567 (L); Bawean, G. Malang, *Buwalda* 2983 (L); Soerabaja, alt. 10 m, *Dorgelo* 1648 (L); Bogor, *Hallier d* 297 (L); G. Ungarang, alt. 1,000-1,600 m, *Junghuhn* 7 (L); Besoeki, Poeger Watangan, alt. 5 m, *Koorders* 21539B (L); Ngarengan, *Koorders* 27454B (L); Tanjung Priok, *Kuhl & Hasselt s.n.* (L); Batavia, Kampong Nangrang, *Schiffner* 2488 (L); Java, *Waitz s.n.* (L).

Lesser Sunda Islands: Timor, *Zippelius s.n.* (L).

Borneo: N. Borneo, Pembliangan, *Amdjah s.n.* (L).

Philippines: Mindoro, Yagaw, *Conklin* 973 (L); Luzon, Laguna, *Elmer* 8067 (K); Zamboanga, alt. 300 & 500 m, *Frake* 530 & 562 (L); Luzon, Rizal Antipolo, *Merrill Sp. Blanco* 437 (K, L); Luzon, Camarines, *Ramos* 1541 (L); Mindanao, Santa Maria, *Reillo* 16459 (K); Mindanao, Davao, Santa Cruz, *Williams* 2709 (K).

Celebes: Menado, Paloe, alt. 5 m, *Eyma* 1747 (L); Menado, *Koorders* 19760B (L).

Moluccas: Ceram, Kp. Kiandarar, alt. few m, *Buwalda* 5971 (L); Ceram, *Forsten s.n.* (L) (several collections); Halmahera, *Idjan & Mochtar* 280 (L); Halmahera, *Pleyte* 73 (1178) (L).

New Guinea: Papua, Maclatchie Point, *Brass* 1187 (K); Papua between S. Coast & Owen Stanley Range, *Burke* 358 (K); Waga Waga, *Daniels Ethnographical Exp.* 6926 (K); NE. New Guinea, *Lewandowsky* 50 (L).

Recently Morton [in J. Linn. Soc. (Bot.) 58 (1962) 232] pointed out that *Ocimum americanum* (= *O. canum* Sims) and *O. basilicum* Linn. differ but little from one another except in size though the former is more hairy. These differences in size are associated, as revealed, with chromosome number: West African material of *O. americanum* having $2n=24$ and of *O. basilicum*, $2n=48$.

3. *Ocimum gratissimum* Linn. Sp. Pl. (1753) 832 (as *Ocimum*); Benth. in DC. Prodr. 12 (1848) 34; Miq. Fl. Ind. Bat. (1858) 938; Hook. f. Fl. Brit. Ind. 4 (1885) 608; Prain in J. As. Soc. Beng. 75, 2 (1907) 702; Ridl. Fl. Mal. Pen. 2 (1923) 644; Back. & Bakh. f. Fl. Java 2 (1965) 639.

A perennial herb or shrubby, 1-2 m high, woody at the base. Stems and branches glabrous, pubescent when young. Leaves membranaceous, elliptic-lanceolate, 5-10 cm long, 2.5-4.5 cm wide, acute, the base cuneate, entire; margins elsewhere coarsely crenate-serrate, puberulent or pubescent; petioles 2-4.5 cm long,

slender, pubescent. False whorls in simple or branched racemes, 10–15 cm long, the rachis softly pubescent; bracts sessile, ovate, acuminate; pedicels very short. Calyx 1.5–2 mm (in fruit 3–4 mm) long; upper lip rounded and recurved; lower lip with central pair of teeth minute and much shorter than the upper lip. Corolla 3.5–4 mm long, pubescent externally. Filaments distinctly exserted; upper pair with a bearded tooth at the base. Nutlets subglobose, 1.5 mm long, rugose.

Distribution: Pantropical.

Ecology: In open waste places or in the settled area at low altitudes.

Vern. names: Selasi, Boekoe-roekoe, rimbo, Selasih (Java); Nai Thoolasi (Malay Peninsula).

Specimens examined:

Sumatra: Pajakumbuh, alt. 550 m, *Meijer 7143* (L).

Malay Peninsula: Perak, Sungei Siput, *Haniff 6923* (K, Sing.); Perak, Bidor Estate, *Reed 8* (Sing.).

Java: Batavia, *Backer s.n.* Sept. 1903 (L); Pekalonggan, Pemalang, alt. 2 m, *Backer 15632* (L); Bangka, *Berkhout s.n.* Aug. 1886 (L); Batavia, Depok, Alt. 90 m, *Bakhuizen v/d Brink Jr. 1375* (L); Tandjong Priok, *Buitendijk s.n.* 1914 (L); Banka, Poeloe Nangka, alt. 3 m, *Bünnemeijer 2073* (L); Bogor, *Hallier D 298* (L); Batavia, alt. 150 m, *Koorders 31408B* (L) ("Selasih"); Bandoeng, alt. 750 m, *Popta 743/212* (L); Bogor, Seogandiredjo 236 (L); Batavia, *Vorderman s.n.* Aug. 1893 (L).

New Guinea: New Britain, alt. 1–3 m, *Peekel 12* (L).

4. *Ocimum sanctum* Linn. Mant. 1 (1767) 85; Benth. Lab. Gen. & Sp. (1832) 11, in DC. Prodr. 12 (1848) 38; Miq. Fl. Ind. Bat. 2 (1858) 939; Hook. f. Fl. Brit. Ind. 4 (1885) 609; Prain in J. As. Soc. Beng. 74, 2 (1907) 699; Merr. Enum. Philip. 3 (1923) 422; Ridl. Fl. Mal. Pen. 2 (1923) 643; Kudo in Mem. Fac. Sc. Ag. Taihoku Un. 2, 2 (1929) 114; Mukerj. in Rec. Bot. Surv. Ind. 14, 1 (1940) 19; Back. & Bakh. f. Fl. Java 2 (1965) 639.

An erect, much branched herb, 30–60 cm high, often woody at the base. Stems and branches soft hairy. Leaves membranaceous, elliptic-oblong or elliptic, 3–6 cm long, 1–2.5 cm wide, obtuse or acute, the base cuneate or attenuate, entire; margins elsewhere entire or remotely serrate; pubescent on both surfaces, especially on the nerves underneath. False whorls in slender raceme or panicles, 8–10 cm long; bracts ovate, acuminate, 2–3 mm long, ciliate; pedicels 3–4.5 mm long, pubescent. Calyx 2.5 mm (in fruit 3–3.5 mm) long; upper lip suborbicular, reflexed, shortly apiculate; lower lip longer than the upper, the teeth 4, lanceolate. Corolla 3.5–4 mm long. Filaments exserted, slender, the upper ones with a small bearded basal appendage. Nutlets minute, broadly ellipsoid, 1.2 mm long, smooth.

Distribution: Pantropic.

Ecology: A weed, commonly found in waste places or in settled areas.

24

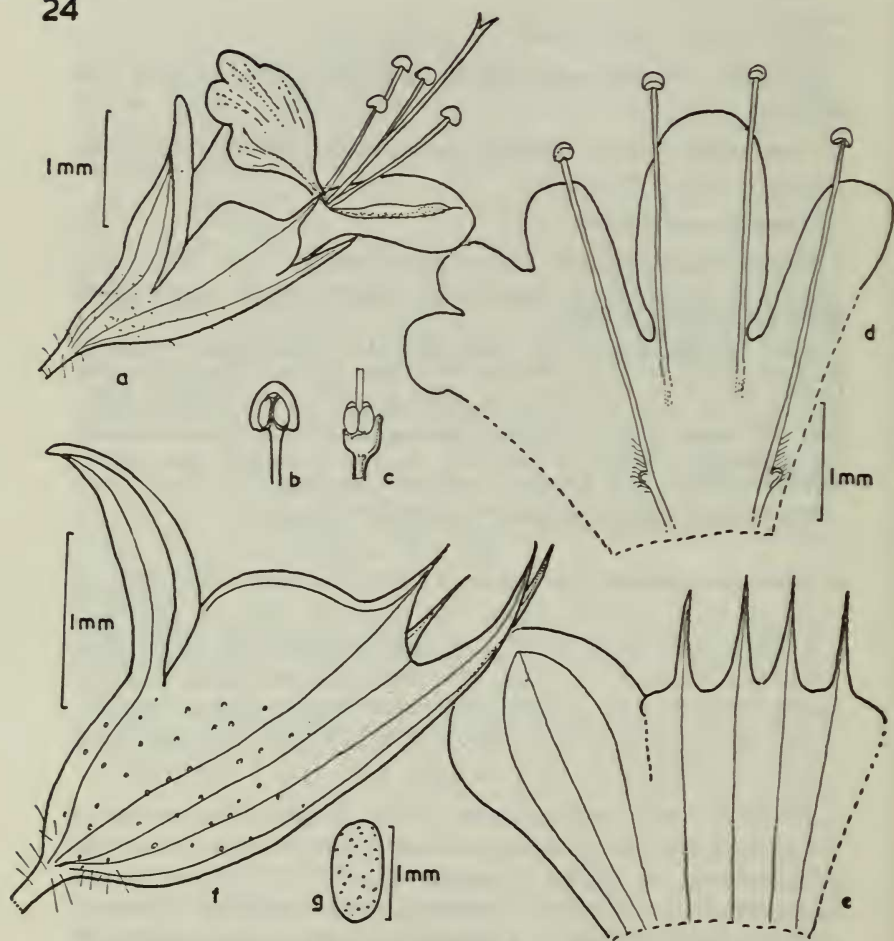


Fig. 24. *Ocimum sanctum* Linn.

a. flower; b. stamen (from bud); c. ovary and nectary disc; d. corolla expanded; e. calyx expanded; f. fruiting calyx; g. nutlet (fresh material).

Vern. names: Roedang tampoea, Kemangi, Selasih poetih (Sumatra); Lampes, Soerawoeng (Java); Oku, Ruku-ruku, Thulasi, Salassay (Malay Peninsula); Kemangen (Celebes); Sagbu, Hanumo, Colo-cogo, Samirig hau (Philippines); Bengh, Sulasi (Borneo).

Specimens examined:

Sumatra: Simaloer, *Achmad* 305 (L); Asahan, *Bartlett & Rue* 403 & 404 (L); Banka, Bontja, alt. 100 m, *Bünnemeijer* 2251 (L); G. Merapi, alt. 900 m, *Bünnemeijer* 4815 (L); Alaslanden, *Daalen* 472 (L); Enggano, Malakoni, *Lütjeharms* 4922 (L); Alaslanden, *Pringo Atmodjo* 472 (L); Kota Puiang, *Rahmat Si Toroes* 3653 (L), Asahan, *Tates* 2559 (L).

Malay Peninsula: Malacca, *Alvins s.n.* (Sing.); Johore, Pulau Tinggi, *Burkill s.n.* 1915 (Sing.); Port Swettenham, *Burkill* 2700 (Sing.); Kedah, Langkawi, *Curtis* 2126 (Sing.) Singapore, Pulau Ubin, *Furtado* 18622 (Sing.); Singapore, *Hullett* 374 (Sing.); Penang, *Lobb* 298 (K.); Prov. Wellesley, Prai, *Nur* 6226 (Sing.); Selangor, Tanjong Karang, *Nur* 34186 (Sing.); Pahang, Pekan, *Ridley* 167 (Sing.); Prov. Wellesley, Pagas Tras, *Ridley* 7168 (Sing.); Selangor, Kuala Lumpur, *Ridley* 10214 (Sing.); Pahang, Kuala Tahan, *Seimund* 831 (Sing.); Singapore, Tandjong Teritip, *Sinclair s.n.* Aug. 1950 (L); Kedah, Ichong Estate, *Spare* 3846 (Sing.); Perak, Matang, *Wray* 5588 (Sing.).

Java: Soerakarta, alt. 150 m, *Backer* 6421 (L); Kediri, alt. 75 m, *Backer* 11280 (L); Tegal alt. 50–100 m, *Backer* 15367 (L); Pekalongan, alt. 5 m, *Backer* 15656 (L); Kendal alt. 1–2 m, *Backer* 16372 (L); Tjitjoroeg, alt. 200 m, *Backer* 17321 (L); Madoera, Bangkalan, alt. 5 m, *Backer* 19111 (L); Madoera, Ketapang, alt. 100 m, *Backer* 19943 (L); Batavia, Bantamtijn, alt. 80 m, *Backer* 24013 (L); Depok, alt. 90 m, *Bakhuizen v/d Brink Jr.* 1753 (L); Poerwakarta, alt. 85 m, *Bakhuizen v/d Brink Sr.* 4883 (L); Bantam, *Blume s.n.* (L); Java, *Blume s.n.* (L) (several collections); Soerabaja, alt. 15 m, *Dorgelo* 362 (L); Buitenzorg, *Hallier* 278 a & b (L); Bogor, *Hallier D* 299 b (L); Batavia, *Hallier s.n.* Aug. 1896 (L); Batavia, *Hasselt s.n.* (L); Semarang, Koedoes, alt. 15–20 m, *Houwing* 791 (L); Tjilatjap, *Junghuhn* 587 (L); Banjoemas, Noesamangir, *Kievits & Kooper Banj.* 15 (L); Banjoemas, Serajoe, *Kievits & Kooper Banj.* 23 (L); Banjoemas alt. 20 m, *Kievits Banj.* 129 (L); Banjoemas, *Kievits Banj.* 2553 (L); Wonoredjo, *Kooper* 542 (L); Besoeki, Poeger-Watangan, *Koorders* 21538B (L); Madioen, alt. 70 m, *Koorders* 23367B (L); Semarang, *Koorders* 24509B (L); Karanganjer, *Koorders* 26206B (L); Pekalongan, *Koorders* 27453B (L); Bogor, *Korthals s.n.* (L); Batavia, Proik, *Raap* 387 (L); Batavia, alt. 100 m, *Steenis* 5303 (L); Batavia, *Vorderman s.n.* (L); Java, *Waitz s.n.* (L).

Lesser Sunda Islands: Tenimber Isl., alt. few m, *Buwalda* 4051 (L); Lombok, Rindjani, alt. 125–225 m, *Elbert* 729 (L); Sumbawa, Bima, 0–200 m, *Elbert* 3973 (L); Soemba, Kindara, *Iboet* 159 (L); Flores, Reo, alt. 20 m, *Posthumus* 3420 (L); Timor *Zippelius s.n.* (L) (several collections).

Borneo: North Borneo, Keningan, alt. 410 m, *Keith* 1611 (L); North Borneo, Pababag Isl., alt. 7 m, *Keith* 7394 (L); Borneo, Bandjarmasin, *Collector Unknown s.n.* (L).

Philippines: Mindoro, Boliran, *Celestino & Castro* 1965 (L); Mindoro, Mt. Yagaw, alt. 400 m, *Conklin* 35952 (L); Mindoro, Mt. Yagaw, alt. 300 & 700 m, *Conklin* 37608 & 37857 (L); Palawan, Baraki, *Fox* 13442 (L); Cagayan Sulu, *Kondo & Edano* 39023 (L); Luzon, Pangasinan, Umingan, *Merrill sp. Blanco* 400 (L); Luzon, *Ramos* 7598 (L); Basilan, *Reillo* 15443 (L); Iloilo, *Soriano* 16465 (L).

Celebes: Muna, Raha, alt. 0–125 m, *Elbert* 2863 (L); Manado, alt. 5 m, *Eyma* 1748 (L); Minahassa, alt. 0 & 10 m, *Koorders* 17384B & 17388B (L); Lake Tempe, *Weber s.n.* (L).

Moluccas: Ceram, *Vriese s.n.* 1859–60 (L); Banda, *Collector Unknown s.n.* (L).

New Guinea: Oeta, Aendoea River, alt. 3 m, *Aet* 525 (L); S. New Guinea, Goboki forest, Oleabi, *Branderhorst* 50 (L); Aroe Isls., P. Kobroör, alt. few m, *Buwalda* 4976 (L); Papua, Veiya, alt. sea level, *Carr* 11605 (L); Merauke, *Koch s.n.* 1904–05 (L); New Guinea, *Zippelius s.n.* (L).

25. ORTHOSIPHON BENTH.

Orthosiphon Benth. in Bot. Reg. 13 (1829) *t.* 1300, in Benth. & Hook. f. Gen. Pl. 2 (1876) 1174; Briq. in E. & P. Pfl. Fam. 4, 3a (1897) 372; v.d. Slesesen in Reinwardtia 5 (1959) 37.

Clerodendranthus Kudo in Mem. Fac. Sc. & Agr. Taihoku Un. 2, 2 (1929) 117.

Herbs or subshrubs. Leaves opposite, serrate or crenulate. False whorls 4–6-flowers, arranged in terminal, racemose inflorescence. Calyx tubular campanulate (in fruit deflexed), 2-lipped; upper lip broad, membranaceous, often recurved; lower lip 4-toothed, the lateral teeth oblong, aristate, the central teeth subulate. Corolla-tube slender, the limb 2-lipped; upper lip 3–4-lobed; lower lip entire, concave. Stamens 4, declinate, included or long-exserted; filaments free, not appendaged at base; anther-locules confluent. Disk 4-lobed, produced anteriorly. Style filiform, entire; stigma capitate or clavate. Nutlets ovoid or globose, smooth.

Species about 40, in tropics of the Old World; 2 species in Malasia.

Key to the species

- A. Leaves often decurrent; stamens and style over 3 cm long, exserted from corolla-tube. 1. *O. aristatus*
- A. Leaves mostly not decurrent; stamens and style less than 1 cm long, included in corolla tube. 2. *O. thymiflorus*

1. **Orthosiphon aristatus** (Bl.) Miq. Fl. Ind. Bat. 2 (1858) 943; Merr. Enum. Philip. 3 (1923) 422; Mukerj. in Rec. Bot. Surv. Ind. 14, 1 (1940) 26; v.d. Slesesen in Reinwardtia 5 (1959) 38; Back. & Bakh. f. Fl. Java 2 (1965) 640.

Ocimum aristatum Bl. Bijdr. (1825) 833.

Ocimum grandiflorum (non L'Heirt.) Bl. Bijdr. (1825) 835.

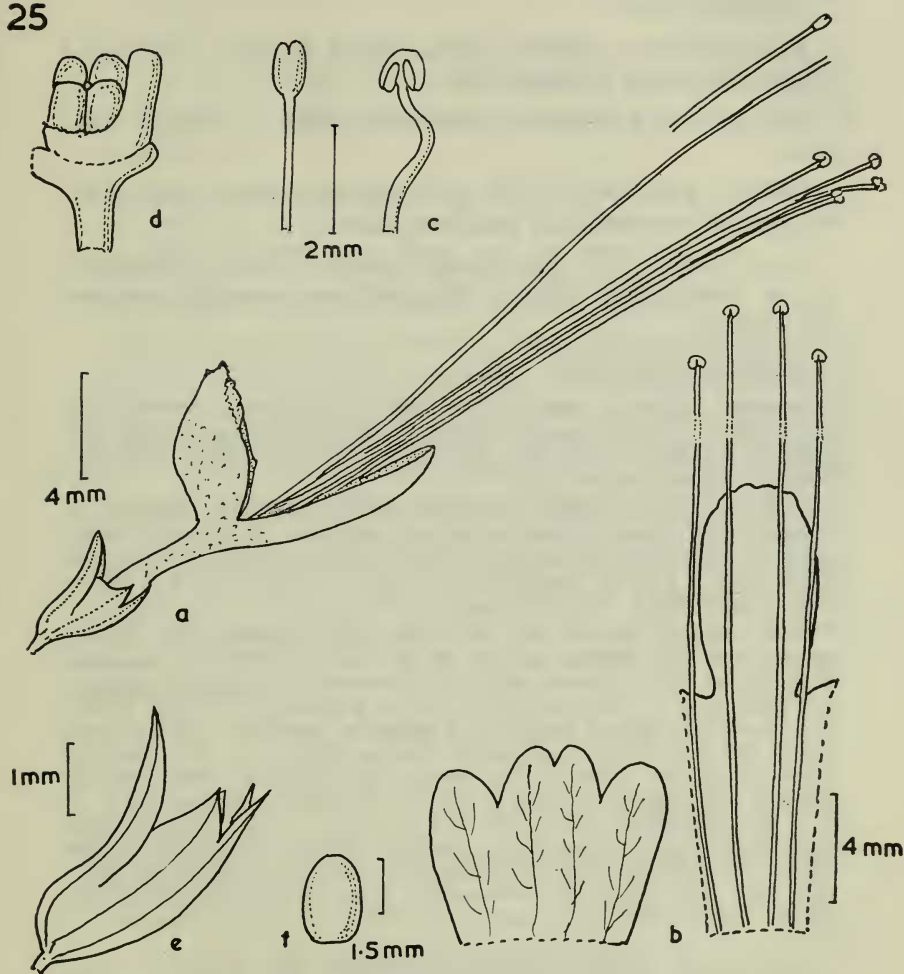
Orthosiphon stamineus Benth. in Wall. Pl. As. Rar. 2 (1831) 15, Lab. Gen. & Sp. (1832) 29, in DC. Prodr. 12 (1848) 52 (incl. var. *augustifolia* Benth.); Miq. Fl. Ind. Bat. 2 (1858) 944; Hook. f. Fl. Brit. Ind. 4 (1835) 615; Prain in J. As. Soc. Bengal 72 (1907) 703; Ridl. Fl. Mal. Pen. 2 (1923) 645.

Clerodendranthus stamineus (Benth.) Kudo in Mem. Fac. Sc. & Agr. 2, 2 (1929) 117.

Orthosiphon spiralis (Lour.) Merr. in Trans. Amer. Phil. Soc. 24, 2 (1935) 344.

A slender, ascending herb, 30–60 cm high; stems 4-angled, sparingly pubescent in young shoots. Leaves chartaceous or membranaceous, ovate or rhombic, 3–9 cm long, 2–4.5 cm broad, acuminate, the base cuneate, entire; margins elsewhere coarsely serrate, puberulous or pubescent on the nerves on both surfaces; petioles 1–2(–4.5) cm long, puberulent. False whorls distantly apart below, arranged in lax terminal racemes 10–15(–20) cm long; bracts sessile, ovate, 1–2 mm long. Calyx curved campanulate,

25

Fig. 25. *Orthosiphon aristatus* Miq.

a. flower; b. upper and lower lips of corolla; c. style-tip and stamen (from bud); d. ovary and nectary disc; e. fruiting calyx; f. nutlet (fresh material).

2.5–4.5 mm (in fruit 6.5–10 mm) long, puberulous on the nerves, gland-dotted or warted externally. Corolla 10–16(–20) mm long; tube slender 10–12 mm long, straight; upper lip shallowly 4-lobed, recurved; lower lip straight, concave. Filaments glabrous, filiform, coiled in bud, projecting about 20 mm beyond corolla-throat. Style 50–60 mm long, the tip enlarged, club-shaped, very briefly 2-fid; the branches clasped. Nutlets broadly oblong, compressed, 1.5 mm long, rugose.

Type specimens: Batavia, Java, *Blume s.n.* (no. 1091?), (L) (Type of *Ocimum aristatum* Bl.).

Distribution: Throughout southeastern Asia to tropical Australia.

Habitat: In thickets at low and medium altitudes, often cultivated as an ornamental or medicinal plant.

Vern. names: Giri giri mareh, Koemis Koetjing (Sumatra); Dacen remoerjoeng (Java); Tjikupi-tjikupi, mangkat kwabon (N. Guinea).

Specimens examined:

Sumatra: Simaleor Island, *Achmad* 818 (L); Moeara, *Boerlage* 223 (L); Sumatra, *Korthals s.n.* (L); Sibolangit, alt. 500 m, *Lorzing* 7255 (L); Sumatra, *Lütjeharms* 5032 (L); Djambi, alt. 30 m, *Posthumus* 1026 (L); Djambi, *Rutten-Kooistra* 72 (L).

Malay Peninsula: Kedah, Langkawi, Dayang Bunting, *Alphonso & Samsuri A 91* (Sing.) (limestone rocks); Langkawi, *Curtis* 2577 (Sing.) Kelantan, Kuala Pertang, *Haniff & Nur* 10375 (Sing.); Langkawi, *Henderson* 29092 (Sing.); Pahang, *Holtum* 24683 (Sing.); Perak, *King's Collector* 8812 (Sing.); Perak, *Reed* 3 (Sing.).

Java: Bandjar, *Backer s.n.* Dec. 1910 (L); Rembang, alt. 150 m, *Backer* 6596 (L); Madjenang, alt. 40 m, *Backer* 18463 (L); Madoera, Djelgong, alt. 100 m, *Backer* 20050 (L); Buitenzorg, alt. 200 m, *Bakhuizen v/d Brink* 6343 (L); Buitenzorg, alt. 250 m, *Bakhuizen v/d Brink Jr.* 926 (L); Rembang, *Beumee* 803 (L); Buitenzorg, *Boerlage s.n.* (L); Java, *Blume* 933 (L) (several collections); Batavia, *Blume s.n.* No. 1091 (L) (Type of *Ocimum aristatum* Bl.); Bantam, alt. 125 m, *Buwalda* 2843 (L); Madioen, alt. 400–900 m, *Elbert* 483 (L); Buitenzorg, *Hallier* 279 a, b, & c (L); Buitenzorg, *Harreveld* 5732 & 7367 (L); Djapara, *Koorders* 35054 (L); Bantam, G. Kantjana, *Koorders* 41718 (L); Tjikampek, *Karsten* 39 (L); Java, *Korthals s.n.* (L); Buitenzorg, alt. 240 m, *Ooststroom* 13896 (L); Java, *Perrottet* 29 (L); Buitenzorg, *Raap* 351 (L); Buitenzorg, alt. 200 m, *Schiffner* 2496 (L); Bogor, *Teysmann s.n.* (L); Java, *Zippelius s.n.* (L).

Lesser Sunda Islands: Sumbawa, *Colfs* 236 (L); Sumbawa, Bima, alt. 200–375 m, *Elbert* 3692 (L); Sumbawa, Bima, alt. 300–450 m, *Elbert* 3700 (L); Sumbawa, Dompou, alt. 40–100 m, *Elbert* 3963 (L); Sumbawa, alt. 500 m, *Kostermans* 18683 (L); Flores, alt. 20 m, *Posthumus* 2377 (L); Timor, *Spanoghe* 50 (L); Sumbawa, Dompou, *Voogd* 1909 (L).

Borneo: Bandjermasing, *Korthals* 20 (L) (several collections); Poeloe Lampe, *Korthals s.n.* Nov. 1836 (L); Doesoen, *Korthals s.n.* (L).

Philippines: Luzon, *Cuming* 734 (K) (Type of *Orthosiphon stamineus* var. *angustifolius* Benth.).

New Guinea: N. Guinea, *Atasrip* 143 (L); Papau, Misima Isl., alt. 20 m, *Brass* 27621 (L); Papau, Woodlark Isl., alt. 100 m, *Brass* 28829 (L); Papua, *Cheesman* 96 (K, L); Papau, Morobe, *Fryar* 3983 (L); Papua, Milne Bay, alt. 10 m, *Hoogland* 4745 (L); Kaisah, alt. 10 m, *Wentholt* 43 (L); Kaliki, alt. 5 m, *Wentholt* 239 (L).

2. *Orthosiphon thymiflorus* (Roth) v.d. Sleesen in Reinwardtia 5 (1959) 42; Back. & Bakh. f. Fl. Java 2 (1965) 640.

Ocimum thymiflorum Roth, Nov. Pl. Sp. (1821) 269.

Ocimum viscosum Roth, l.c. 274.

Ocimum tomentosus (non De Wildem) Benth. in Wall. Pl. As. Rar. 2 (1831) 14, Lab. Gen. & Sp. (1832) 27, in DC. Prodr. 12 (1848) 51.

Ocimum glabratus Benth. in Wall. Pl. As. Rar. 2 (1831) 14, Lab. Gen. & Sp. (1832) 28, in DC. Prodr. 12 (1848) 50; Miq. Fl. Ind. Bat. 2 (1858) 942; Mukerj. in Rec. Bot. Surv. Ind. 14 (1940) 23.

Orthosiphon viscosus Benth. in Wall. Pl. As. Rar. 2 (1831) 14, Lab. Gen. & Sp. (1832) 27, in DC. Prodr. 12 (1848) 50; Mukerj. in Rec. Bot. Surv. Ind. 14 (1940) 23.

Orthosiphon petiolaris Miq. Fl. Ind. Bat. 2 (1858) 943.

Erect or ascending herb, 30–50 cm high. Stems often glandulate-pubescent. Leaves ovate or broadly ovate, 3–4.5(–7) cm long, 2.5–3(–4.5) cm wide, obtuse or subacute, the base rounded or truncate, entire; margins elsewhere crenate or wavy, glabrescent above, viscous and glandulate-punctate below; petioles 1–2.5(–5) cm long, pubescent. False whorls 5–6-flowered; racemose inflorescence terminal, 5–8(–12) cm long; bracts ovate, acuminate, 2–5 mm long; pedicels 2–3 mm long, shortly pubescent. Calyx tubular, 4–5 mm (in fruit 7–8 mm) long, puberulous externally. Corolla 11–14 mm long, the tube slightly incurved, puberulous. Stamens included. Style 9–10 mm long. Nutlets subglobose, compressed, minutely glandulate.

Distribution: India, Ceylon, Indo-China to Malesia.

Specimens examined:

Java: *Horsfield Lab.* 23 (U 69547 A, type of *Orthosiphon petiolaris* Miq., duplicate, K).

Malay Peninsula: Kuala Tekam, Pahang *Evans s.n.* (K); Kota Bahru, Kelantan, *Ridley s.n.* (K).

26. PARAPHLOMIS PRAIN.

Paraphlomis Prain in Ann. Bot. Gard. Calc. 9 (1901) 60, *in obs.*, in J. As. Soc. Beng. 74, 2 (1907) 791; Ridl. Fl. Mal. Pen. 2 (1923) 651; Kudo, in Mem. Fac. Sc. & Ag. Taihoku Un. 2, 2 (1929) 209.

Herbs or shrubs. Leaves opposite, membranaceous, long-petiolate. Flowers medium-sized, in dense axillary, many-flowered false-whorls, often forming globose clusters; bracteoles numerous, filiform. Calyx 10-nerved, more or less equally 5-toothed, the teeth deciduous or persistent; tube slightly incurved. Corolla-tube pubescent externally, glabrous and annulate within; upper lip erect; lower lip spreading, 3-lobed. Stamens 4, ascending under

upper lip, the lower pair longer; all filaments without basal appendages; anthers connivent, the 2 locules divaricate; filaments glabrous. Disk uniform, entire. Style 2-fid, the lobes subequal or the upper one shorter. Nutlets obovoid, triquetrous below, rounded above and on the dorsal surface, glabrous; pericarp thick, more or less coriaceous.

Species 6 or more, Eastern Himalayas to S. China, Formosa; 2 in Malesia.

Key to the species

A. False whorls only sparingly hirsute; corolla 2–2.5 cm long; fruiting calyx glabrous, the teeth often broken off.

1. *P. javanica*

A. False whorls densely covered with long woolly hairs, golden yellow in colour; corolla 1.5–2 cm long; fruiting calyx hirsute or woolly pubescent, the teeth persistent. 2. *P. oblongifolia*

1. **Paraphlomis javanica** (Bl.) Prain in Ann. Bot. Gard. Calc. 9 (1901) 59, *in obs*; Back. & Bakh. f. Fl. Java 2 (1965) 619.

Leonurus javanicus Bl. Bijdr. (1826) 828; Benth. Lab. Gen. & Sp. (1834) 522.

Phlomis javanica (Bl.) Prain in Ann. Bot. Gard. Calc. 3 (1891) 231, 9 (1901) 59.

Phlomis rugosa Benth. in Wall. Pl. As. Rar. 1 (1830) 63, Lab. Gen. & Sp. (1834) 634, in DC. Prodr. 12 (1848) 545; Hook. f. Fl. Brit. Ind. 4 (1885) 693; Prain in Ann. Bot. Gard. Calc. 3 (1891) 231, *in Nota*; Stapf. in Trans. Linn. Soc. London 4 (2) (1894) 216.

Paraphlomis rugosa (Benth.) Prain in Ann. Bot. Gard. Calc. 9 (1901) 60, *pl. 74, in nota*. in J. As. Soc. Beng. 74 (1907) 721; Merr. Enum. Philip. 3 (1923) 412; Ridl. Fl. Mal. Pen. 2 (1923) 651; Kudo in Mem. Fac. Sci. & Ag. Taihoku Un. 2, 2 (1929) 209.

Gomphostemma petiolare Miq. Fl. Ind. Bat. (1859) 987. *syn. nov.*

Gomphostemma membranifolium Miq. Fl. Ind. Bat. (1859) 988.

Gomphostemma luzonense Elm. Leaf. Philip. Bot. 1 (1908) 339.

Lamium gesnerioides Hayata, Icon. Pl. Formos. 8 (1918) 92.

Lamium longepetiolata Hayata, Icon. Pl. Formos. 8 (1918) 92.

Gomphostemma sumatrense Ridl. in J. Mal. Br. R. As. Soc. 1 (1923) 85. *Syn. nov.*

Paraphlomis brevidens Merr. in Pap. Mich. Acad. Sc. 1933. (1934) 193. *Syn. nov.*

A subshrub, 1–1.5 m high. Stems stout or slender, minutely hirsute. Leaves thin membranaceous, elliptic, oblong-ovate or oblong-lanceolate, 15–30 cm long, 6–10 cm wide, acuminate or caudate, the base cuneate or truncate or rounded, entire; margins

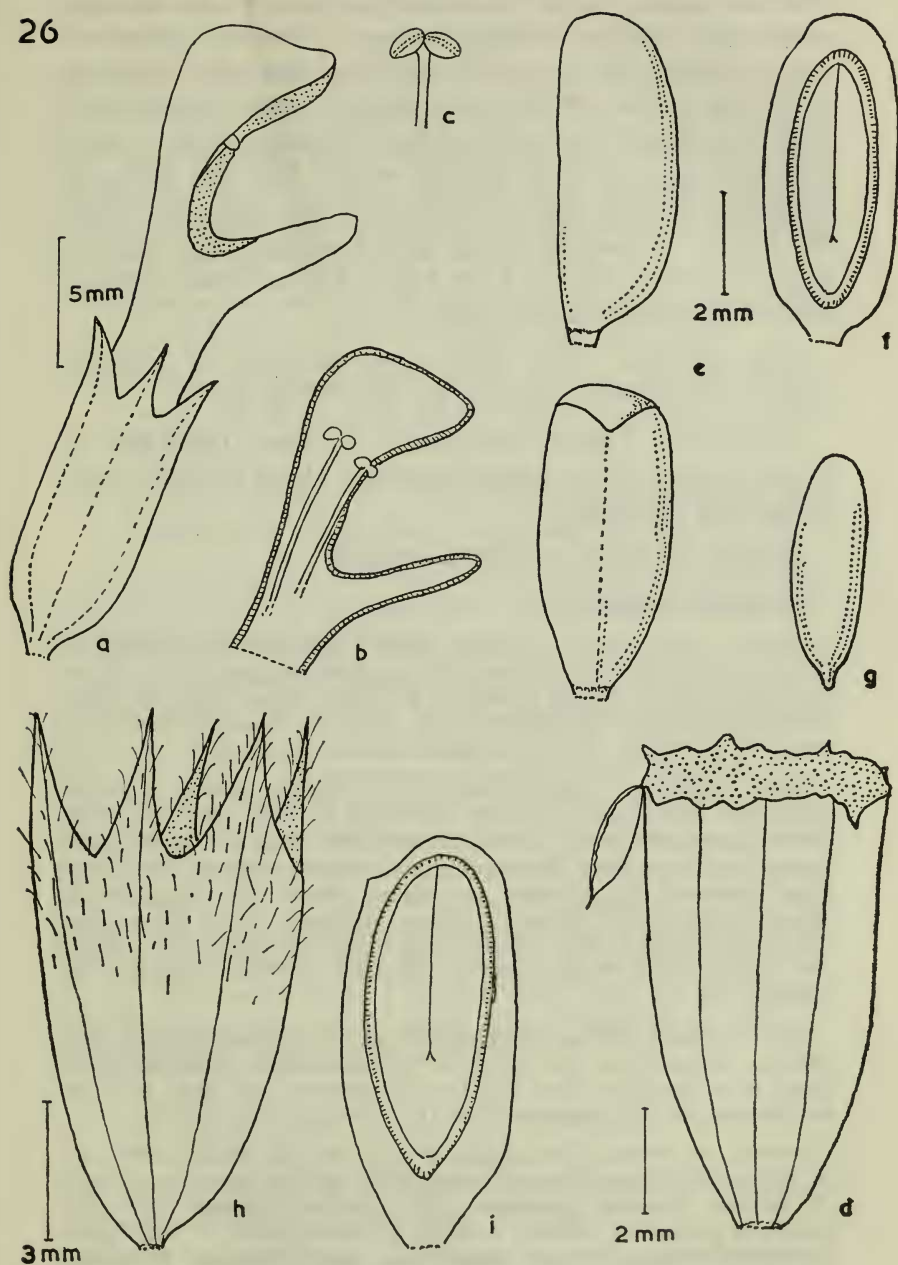


Fig. 26. *Paraphlomis javanica* Prain (a-g) and *P. oblongifolia* Prain (h & i).

a. flower; b. half corolla (upper portion); c. stamen; d. fruiting calyx; e. nutlet (in lateral and ventral views) f. section of nutlet; g. embryo; h. fruiting calyx; i. section of nutlet. (a-c. Horsfield s.n.; d-g. Clements 31629; h & i. Popta 1517).

elsewhere irregularly crenate-serrate, glabrous or with minute scattered hairs on the nerves on both surfaces. Flowers in small distant false whorls, axillary; bracteoles filiform, glabrescent. Calyx turbinate, 0.8–1.2 cm (in fruit about the same length, the teeth often broken off) long; tube slightly curved, hispid below; teeth 5, lanceolate, the base triangular, membranaceous. Corolla 2–2.5 cm long, the tube annulate within; both lips pubescent externally, upper lip narrow, rounded at apex; lower lip 3-lobed, the mid-lobe oblong, the lateral lobes lanceolate. Style branches subequal. Nutlets obovoid, 6 mm long, 3–3.5 mm broad, acute and triquetrous below, rounded above.

Type specimen: Java, *Blume s.n.* (lectotype of *Leonurus javanicus* BL.) (*Herb. Lugd. Bat. no. 904, 356–66*) (L).

Distribution: Eastern Himalayas to Thailand, Indo-China, S. China, Formosa and to Malesia (Sumatra, Malay Peninsula, Java, Borneo and Philippines).

Ecology: In forests at medium altitudes.

Specimens examined:

Sumatra: Karo Plateau, Berastagi, Deleng Singkoet, *Bartlett 8568* (L) (Type of *Paraphlomis brevifidens* Merr.); Karo Plateau, Dolok Boros, alt. 1,450–1,500 m, *Lörzing 16169* (L); E. Coast, Asahan, slope of Dolok Se Manoeck-manoeck, *Rahmat Si Boeca 9772* (L); Berastagi, *Ridley s.n.* Feb. 1912 (K) (Type of *Gomphostemma sumatrense* Ridl.).

Malay Peninsula: Perak, *Anderson 112* (Sing.); Pahang, Cameron Highlands, *Batten-Pooll s.n.* Nov. 1940 (Sing.); Perak, Natuloo, *Curtis 2726* (K, Sing.) (fls. yellow); Perak, *Haniff 14259* (Sing.); Cameron Highlands, *Henderson 23614* (Sing.); Selangor, Ginling Simpak, *Hume 9057* (Sing.) Selangor, Ulu Gombak, alt. 600 m, *Hume 9513* (Sing.); Perak, *King's Collector 2372* (Sing.); Cameron Highlands, alt. 1,300 m, *Nur 32876* (K, L, Sing.); Perak, *Ridley 2892* (Sing.); Pahang; Telom, *Ridley 13715* (BM, Sing.); Perak, Maxwell's Hill, alt. 1,000 m, *Scortechini 339* (Sing.).

Java: G. Salak, *Blume s.n.* (L) (lectotype, of *Leonurus javanicus* Bl.); Patjitan, *Horsfield s.n.* (K) (Type of *Gomphostemma membranifolium* Miq.); Java, *Koorders 39041* (L); Java, *Korthals s.n.* (L); Java, alt. 1,150 m, *Mousset 620* (L); *Reinwardt s.n.* (L).

Borneo: N. Borneo, Ulu Liqagu, *Chew Corner & Stainton 2894* (K); N. Borneo, Minitindok Gorge, *Clemens 10465* (K) (fls. white; seed black); N. Borneo, Kinabalu, Tenompok, alt. 1,800 m, *Clemens 27897* (K); Kinabalu, Dallas, alt. 1,000 m, *J. & M. S. Clemens 29657 = 26317* (BM, K, L) (fls. cream with dark purple inner parts); Kinabalu, Penibukan, alt. 1,400 m, *Clemens 30683, 31629* (BM, L) & *40300* (K, L) (fls. cream with pink center).

Philippines: Philippines, *Cuming 1876* (BM, K); Leyte, Ormoc, Lake Danao, *Edano 11920* (L, Sing.); Luzon, Tayabas, *Elmer 7433* (K) (Type of *Gomphostemma luzonense* Elm.); Philippines, *Elmer 9176* (K), Rizal, *Loher 6583* (K); Luzon, Laguna, *Mabesa 25379* (L, Sing.); Luzon, Rizal, *Ramos 992* (K); Rizal, Mt. Irig, *Ramos 41962* (L); Morong, *Vidal 3488* (K).

In examining the several type specimens of Blume's *Leonurus javanicus*, *Leonurus oblongifolius* and *Prasium javanicum*, some obvious technical errors — the displacement of labels and specimens — were noticed. This fact has been pointed out in the annotated sheets made by Dr. A. G. L. Adelbert, (the author of the family Labiatae, in Backer's *Bekn. Fl. Java* (em. ed.) 14, 1954, fam. 201). With the willing assistance of Prof. C. G. G. J. van Steenis, and Mr. J. H. Kern, we have carefully checked Blume's original description with the specimens he studied, and selected the following specimens as lectotypes, respectively.

- (1) *Leonurus javanicus* Bl. [or *Paraphlomis javanica* (Bl.) Prain] E. Java, Blume. (*Herb. Lugd. Bat. No. 904, 356–66*).
- (2) *Leonurus oblongifolius* Bl. [or *Paraphlomis oblongifolia* (Bl.) Prain] Mt. Salak, Java, Blume (*Herb. Lugd. Bat. No. 904, 356–65*).
- (3) *Prasium javanicum* Bl. [or *Gomphostemma javanicum* (Bl.) Benth.] Java, Blume (*Herb. Lugd. Bat. No. 904, 354–154*).

I fully agree with Dr. Adelbert (in Annotate sheet, Herb. Leiden) in reducing *Paraphlomis rugosa* (Benth.) Prain as synonymous with *Paraphlomis javanica* (Bl.) Prain.

I also consider *Paraphlomis javanica* (Bl.) Prain as a rather variable species. In addition to the synonyms given by Prain, Kudo (under *P. rugosa* Prain), I add here the following 3 binomials to the list. (1) *Gomphostemma petiolare* Miq. which is a new name intended to replace *Leonurus javanicus* Bl. to avoid confusion with *Gomphostemma javanicum* Benth. (2) *Gomphostemma sumatrense* Ridl. of which the types specimen was collected from Berastagi, Sumatra, by Ridley, which is indistinguishable from the typical form of this species. (3) *Paraphlomis brevidens* Merr. which differs from *P. javanica* (Bl.) Prain (as *P. rugosa* Prain) mainly in its very short calyx teeth. I do not think they are specifically different. Incidentally, nearly all the Borneo materials studied are characterized by their shorter calyx-teeth.

2. ***Paraphlomis oblongifolia*** (Bl.) Prain in *Ann. Bot. Gard. Calc.* 9 (1901) 59, *in nota*.

Leonurus oblongifolius Bl. *Bijdr.* (1826) 828; Benth. *Lab. Gen. & Sp.* (1834) 522, in DC. *Prodr.* 12 (1848) 502.

Phlomis oblongifolia (Bl.) O. Kuntze, *Rev. Gen.* 2 (1891) 529; Prain in *Ann. R. Bot. Gard. Calc.* 3 (1891) 231, *in nota*, 9 (1901) 59, *pl.* 73.

Gomphostemma macrophyllum Miq. *Fl. Ind. Bat.* 2 (1859) 988.

Shrubby, 1–2 m high. Stems and branches soft-woolly. Leaves thin membranaceous, oblong ovate, 15–20 cm long, 6–8 cm wide, acuminate or cordate, the base cuneate, entire; margins elsewhere

remotely toothed, springly hispid on the nerves on both surfaces; petioles very slender, 5–8 cm long. Flowers in distant axillary false-whorls, densely covered with long golden hairs; bracts filiform. Calyx obconic-campanulate, 1.2–1.3 cm (in fruit 1.2–1.4 cm) long; tube slightly curved, hirsute; teeth subulate. Corolla 1.5–2 cm long, densely pubescent externally; upper lip narrow, the apex truncate; lower lip with 3 subequal rounded lobes. Posterior style branches much shorter than the anterior. Nutlets oblong, 7–8 mm long, 3.5 mm broad, subtriquetrous, glabrous.

Distribution: Endemic to Malesia (Sumatra, Java, and Celebes).

Type: Mt. Salak, Java, *Blume s.n.* (L), (lectotype of *Leonurus oblongifolius* Bl. *Herb. Lugd. Bat. No. 904*, 356–65).

Ecology: In primary forest at medium altitudes.

Vern. names: Bubukuan bulu (Java).

Specimens examined:

Sumatra: G. Malintang, alt. 1,200 m, *Bünnemeyer 3742* (L); G. Marapi, *Bünnemeyer 4565* (L); Kota Agoeng, *Cramer s.n.* 1915 (L); Karo, Biang, *Lörzing 14420* (L) (fls. light yellow, corolla 14 mm long, side-lobe ovate-lanceolate; nutlets dark blue-green nearly back); Berastagi, *Ridley s.n.* Feb. 1921 (K); Kabandjahe, *Surbeck 30* (L); E. coast, *Surbeck 358* (L).

Java: G. Gedeh, alt. 1,350 m, *Backer 14975* (L); G. Gedeh, alt. 1,400 m, *Backer 22162* (L, Sing.); G. Salak, *Blume s.n.* (lectotype of *Paraphlomis oblongifolia* (Bl.) Prain.); Tjibodas, *Boerlage s.n.* 1917 (K); G. Gede, *Burkill 8226* (fls. pale yellow; fr. bluish green); Tjibodas, alt. 1,500 m, *Djamhari 107* (L); S. E. Java, *Forbes 997 c* (K); Tjibodas, *Hallier 253* (K, L); G. Salak, 900–1,000 m, *Hoochreutiner 179* (L); Java, *Junghuhn 50* (K); Tjibodas, *Koorders 31686* (L); Tjibodas, *Lam 309* (L); Tjisaroëa, alt. 1,200 m, *Ooststroom 12834* (L); Tjibodas, *Ooststroom 13409* (L); Tjibodas, alt. 1,500 m, *Popta 1517* (L); Tjilatjap, *Riviers s.n.* 1920 (L); G. Gedeh, *Sapiin 465* (L).

Celebes: Celebes, *Forsten s.n.* (L).

As a result of the displacement of labels with the specimens, Merrill (in *Pap. Mich. Acad. Sc.* 1933, 19 (1934) 194) was perplexed and erroneously reduced this species as synonymous with *Paraphlomis javanica* Prain (as *P. rugosa*).

Miquel thought the plant formerly described by Blume as *Leonurus oblongifolius* should be referred to the genus *Gomphostemma*. As he was aware that there was another plant, an entirely different one from India, already described under the name *Gomphostemma oblongum* Benth., he therefore proposed a new binomial *Gomphostemma macrophyllum* Miq. to replace *Leonurus oblongifolius* Bl.

The report of occurrence of this species in Celebes by Miquel was based on a sterile specimen collected by Forsten around 1840.

27. PLECTRANTHUS L'HERIT. NOM. CONS.

Plectranthus L'Hérit., Stirp. Nov. (1788) 84, t. 41, 42, *nom. cons.*;
Benth. in Benth. & Hook. f. Gen. Pl. 2 (1876) 1175; Briq. in E.
& P. Pfl. Fam. 4, 3a (1897) 352.

Germanea Lamk. Encyc. 2 (1788) 690.

Isodon Schrad. ex Benth. Lab. Gen. & Sp. (1832) 40; Kudo in
Mem. Fac. Sci. & Agr. Taihoku Un. 2, 2 (1929) 118.

Rabdosia Hassk. in Flora, 25 (1842) 2, Beibl.

Herbs or undershrubs. Leaves opposite petiolate. Flowers usually small, generally in 6–8-flowers cymes, forming axillary spurious racemes or terminal panicles. Calyx 5-toothed, subequal or 2-lipped, often accrescent in fruit. Corolla-tube exserted, long or short, decurved or straight, sometimes having a spur or angle on the upper side; limb, 2-lipped, the upper lip short, 3–4-fid, recurved, the lower lip entire or notched, long boat-shaped. Stamens 4, declinate; filaments free or adnate to the corolla-tube but free from each other; anther-locules usually confluent. Disk usually produced anteriorly, there nearly to fully as long as the ovary. Style briefly 2-fid. Nutlets orbicular or occasionally oblong or ovoid, smooth, granulate or punctate.

Species about 100, mainly in the tropical and subtropical regions of Africa, Asia, Australia and the Pacific Islands. About 8 species are found in Malesia.

Key to the species

- A. Calyx (in flowering) equally or subequally 5-toothed, not forming two lips; uppermost tooth as broad as or only slightly broader than the other teeth.
 - B. Calyx (in flowering) less than 2 mm long; calyx-teeth deltoid or nearly so.
 - C. Fruiting calyx 3.5–4.5 mm long; lower calyx-teeth (in fruiting) acute; leaves ovate or rhomboid, the apex acute, the base acute or rounded; upper leaves petiolate; stamens included. 1. *P. javanicus*
 - C. Fruiting calyx 2.5–3.5 mm long; lower calyx-teeth obtuse or rounded; leaves more or less deltoid, the apex acuminate, long-caudate, the base truncate; upper leaves sessile or amplexicaul; stamens long-exserted. 2. *P. teysmannii*
 - B. Calyx over 3–4 mm long; calyx teeth lanceolate or subulate.
 - C. Calyx obliquely gibbous at the base; corolla 6–8 mm long, the corolla tube very short (about 1 mm long), slender, not gibbous. 3. *P. petraeus*
 - C. Calyx straight, not gibbous at the base; corolla 10–12 mm long, the corolla tube 5–6 mm long, distinctly gibbous above. 4. *P. steenisii*

- A. Calyx unequally 5-toothed, 2-lipped; the uppermost tooth generally much broader than the others.
- B. Inflorescences paniculate, 20–30 cm long.
 - C. Flowers 5–10 in a false whorl; stamens all attached near the throat of corolla, nearly equal. 5. *P. apoensis*
 - C. Flowers 20 or more in a false whorl; stamens inserted at two different levels, 2 attached near the throat, 2 at the base of corolla. 6. *P. congestus*
- B. Inflorescences racemose, unbranched, or occasionally with 1 or 2 short branches at the base.
 - C. Racemose inflorescence 25–35 cm long; false whorls 8–12 flowered, congested; calyx densely woolly; the uppermost calyx-lobe reflexed and decurrent in fruit. 7. *P. parviflorus*
 - C. Racemose inflorescence 8–10 (–12) cm long; false whorls 5–6 flowered, laxly disposed; calyx sparingly hirsute; the uppermost calyx-lobe erect and not decurrent in fruit. 8. *P. klossii*

1. **Plectranthus javanicus** (Bl.) Benth. Lab. Gen. & Sp. (1832) 45, in DC. Prodr. 12 (1848) 69; Miq. Fl. Ind. Bat. (1858) 946; Koord. Exk. Fl. Jav. 3 (1912) 155; Back. & Bakh. f. Fl. Java 2 (1965) 636.

Elsholtzia javanica Bl. Bijdr. (1826) 825.

Rabdosia javanica (Bl.) Hassk. in Flora, 25 (1842) 2.

Plectranthus intermedius Zoll. & Mor. in Mor. Syst. Verz. (1854) 55; Koord. Exk. Fl. Jav. 3 (1912) 154. *syn. nov.*

Plectranthus benthamianus Miq. Fl. Ind. Bat. (1858) 946; Koord. Exk. Fl. Jav. (1912) 155. *syn. nov.*

Plectranthus diffusus Merr. Philip. J. Sc. 1 (1906) suppl. 235, 5 (1910) Bot. 382, Enum. Philip. 3 (1923) 418. *syn. nov.*

Moschosma philippinense Elmer, Leafl. Phil. Bot. 10 (1939) 3809.

A herb or shrubby, 1.5–2.5 m high, much-branched. Stems and branches angled, slender, pubescent. Leaves membranaceous, ovate to oblong-ovate or rhomboid, 2–5 (–8) cm long, 1–2.5 (–4.5) cm wide, acuminate, the base acute or rounded, entire; margins elsewhere prominently serrate; crisped hairy on both surfaces; petioles 0.5–1 cm long. Flowers in lax, lateral thyse and forming large compound terminal panicles, 20–30 (or more) cm long; the bracts foliaceous, gradually reduced upwards. Calyx 1.5–2 mm (in fruit 4.5–5 mm) long, sparingly hirsute, subequally 5-toothed, the teeth acute. Corolla 5–6 mm long, straight, the limb gibbous, 2-lipped. Stamens free, the filaments pubescent below. Nutlets ovoid or ellipsoid, about 1 mm long, glabrous, smooth.

Type specimen: Java, Buitenzorg, *Blume s.n.* (L, lectotype and duplicates of *Elscholtzia javanica* Bl. several collections).

Distribution: Endemic to Malesia.

Ecology: In damp forest floors or in shaded ravines along streams at medium low to altitudes (500–2,400 m).

Vern. names: Surawang langit (Java); Lateng ajam (Sumatra).

Specimens examined:

Sumatra: Karo Plateau, alt. 1,500 m, *Lörzing 13658* (L); Korinchi, alt. 1,500 m, *Robinson & Kloss 63* (BM) (fls. violet).

Java: G. Tangkoeban, *Backer s.n.* Oct. 1903 (L); Garoet, Pangentjongan, alt. 1,400 m, *Backer s.n.* 1909 (L); Pasoeroean, Tosari, alt. 1,700 m, *Backer 8352* (L); G. Boerangrang, alt. 900–1,000 m, *Backer 14122* (L); Diëng Plateau, alt. 2,000–2,100 m, *Backer 21624* (L); Java, *Backer & Coert 409* (L); Besoeki, alt. 1,500–1,600 m, *Backer 37437* (L); Java, *Blume s.n.* (L) (lectotype and duplicates of *Elscholtzia javanica* Bl.) (several collections); Java, *Boerlage s.n.* (L) (several collections); G. Papandajan, *Boerlage s.n.* (L); Garoet, *Burck s.n.* June 1891 (L); Preanger, *Denker 90* (L); Madioen, Lawoe, alt. 1,300–1,400 m, *Elbert s.n.* Oct.–Nov. 1907 (L); Tjibodas, G. Puteri, alt. 1,700 m, *Enoh 238* (L); Java, *Forbes 611* (BM, L); Pasoeroean, alt. 2,150 m, *Gisius 18* (L); Telaga, Warna, *Hallier s.n.* Feb. 1895 (L); G. Prahoe, *Horsfield s.n.* (K, U 69537 A) (Type of *Plectranthus benthamianus* Miq.); Java, *Horsfield 20* (BM, K); Java, *Junghuhn 6 & 134* (L); Madioen, alt. 850 m, *Koorders 23835* (K); Ngadisari, alt. 2,400 m, *Koorders 37617* (K); Semarang, *Koorders 27789* (K); Preanger, alt. 720 m, *Koorders 43222* (K); Besoeki, alt. 2,100 m, *Koorders 43517* (K); Java, *Korthals s.n.* (L); Tosari, G. Bromo, *Kreulen 145* (L); W. Java, *Kuhl & Hasselt s.n.* (L); Bandoeng, G. Windoe, *Native Collector 338* (L); Soerabaja, G. Andjasmoro, *Radermacher s.n.* Aug. 1930 (L); Idjen Plateau, *Rent s.n.* June 1927 (L); Java, *Reinwardt s.n.* (L); Tjibodas, G. Gedeh, *Sapiin 2069* (L); Pasir Kiamis, *Schiffner s.n.* 1893 (L); Tjibodas, G. Puteri, *Soewarta 163* (L); Pasoeroean, G. Tengger, alt. 2,000–2,300 m, *Steenis 7235* (L); Besoeki, Jang Plateau, alt. 2,000 m, *Steenis 11039* (L); Java, *Waitz s.n.* (L); Papandajan, *Went s.n.* (L); Tosari, *Went s.n.* (L); Tjibodas, *Went s.n.* (L); Java, *Zollinger 1761* (G) (Type of *Plectranthus intemedius* Zoll. & Mor.)

Lesser Sunda Islands: Timor *Forbes 3888* (L); Sumbawa, alt. 500–700 m, *Kostermans 18636* (K, L); Lombok, *Voogd 2098* (K).

Philippines: Luzon, Benguet, Baguio, *Elmer 8406* (K, L); Benguet, Mt. Libbung, *Mendoza 40947* (K); Luzon, Lepanto, Mt. Data, *Merrill 4554* (K) (Cotype of *Plectranthus diffusus* Merr.); Luzon, Benguet, Baguio, *Merrill 11654* (BM, K, L).

Type specimens of the following 3 species have been examined: *Plectranthus benthamianus* Miq., *Pl. intermedius* Zoll. & Mor., *Pl. diffusus* Merr. Except in the first one which is based on a Horsfield's collection, the dimension of foliate leaves are much larger (7–10 cm by 4.5–5 cm) than usual, no other conspicuous differences can be found.

2. *Plectranthus teysmanni* Miq. Fl. Ind. Bat. (1858) 954; Back. & Bakh. f. Fl. Java 2 (1965) 636.

? *Plectranthus zollingeri* Briq. in Ann. Conserv. & Jard. Bot. Geneve (1898) 234.

Erect herb or shrubby, 0.5–1.5 m high. Stems and branches tetragonous, slender, pubescent. Leaves chartaceous, ovate or elliptic-ovate, 2.5–5 cm long, 1.5–3.5 cm wide, acute or acuminate, the base truncate or rounded, rarely acute, entire; margins elsewhere serrate-dentate, puberulent above, densely glandulate-pubescent beneath; petioles 0.5–1 cm long. Flowers in lax cymes disposed in lateral thyrses, and forming a large terminal panicle 12–15 (–20) cm long, 4–5 cm across. Calyx subcampanulate, 1.5–2 mm (in fruit 3.5–4 mm) long, densely glandulate-villous, 5-toothed, the teeth blunt or rounded. Corolla 5–6 mm long, the tube straight. Filaments long-exserted. Nutlets ovoid, 0.8–1 mm long.

Type: Java, op den Wilis in Madioen, *Teymann s.n.* (U 37953, 37954).

Distribution: Endemic to Malesia.

Ecology: In shaded and damp places in or along the forest at altitudes 1,000–2,600 m.

Vern. name: Slanghet (Java).

Specimens examined:

Java: G. Slamet, alt. 2,620 m, *Backer* 486 (L); G. Mahameroe, alt. 2,400 m, *Backer* 3734 (L); Idjen Plateau, G. Merapi, alt. 1,900–2,150 m, *Backer* 25295 (L); Garoet, *Burck s.n.* July 1891 (L); Java, *Coert* 816 (L); Tengger, G. Djembangan, alt. 2,000–3,000 *Coert* 1508 (L); Semarang, *Koorders* 28049 (K, L); Besoeki, alt. 2,100 m, *Koorders* 43426 (K); Java, *Mousset* 476 (L); Preanger, *Soegandiredja s.n.* April 1909 (L); Madioen, Wilis, *Teymann s.n.* (Type, U 37953, 37954).

Lesser Sunda Islands: Lombok, Rindjani, alt. 1,500–1,570, 2,200–2,300 & 1,175–1,250 m, *Elbert* 1042, 1048 (L) & 1476 (K, L); Flores, alt. 1,000 m, *Jaag* 1564 (L); Sumbawa, *Kostermans* 18257 (K).

Borneo: Mt. Kinabalu, alt. 1,600 m, *Chew, Corner & Stainton* 1276 (K, Sing) (fls. white).

Celebes: Lombasang, alt. 950 m, *Bünnemeijer* 10947 (L); Celebes, *Bünnemeijer* 11034 (K); G. Bonthain, alt. 2,300 m, *Bünnemeijer* 11887 (K, L); Masamba, Kamboeno, alt. 2,200–2,600 m, *Eyma* 1329 (L); Lompo Batang, alt. 1,800 m, *Monod de Froideville* 218 (L); Gowa, Lembaja, alt. 1,600 m, *Neth. Ind. For. Service s.n.* May 1936 (L); Malino, alt. 1,000 m, *Steenis* 10389 (L).

A recent collection from Mt. Kinabalu, Sabah (*Chew, Corner & Stainton* 1276) agrees with the typical form of the species in general habit, in leaf and floral characters. However, it differs from the latter in the shorter and narrower terminal thyrse (about 8–9 cm long, 4–5 cm across), and in the calyx teeth being almost rounded at the tips. This may represent a variety or form of the species.

Backer and Bakhuizen van den Brink Jr. (l.c. 636) suggested that *Plectranthus zollingeri* Briq. (based on Zollinger no. 2215, from Java) might be a synonym of *Pl. tezmanni* Miq.

3. ***Plectranthus petraeus*** Backer ex Adelb. in Reinwardtia 3 (1954) 152, f. 3.; Back. & Bakh. f. Fl. Java 2 (1965) 636.

Shrubby, 1–1.5 m high, very fragrant. Stems and branches slender, nearly terete. Leaves membranaceous, elliptic or ovate, 4–10 cm long, 3–6 cm wide, acute or obtuse, the base cuneate or shallowly cordate, entire; margins elsewhere crenate-serrate; petioles 1–3 cm long. Flowers in spurious spikes disposed in large terminal panicles, 15–20 cm long; bracts rhomboid, sessile, 2.5 mm long and broad; pedicels 2–3 mm long. Calyx campanulate, curved, 3–3.5 mm (in fruit 4–5 mm) long, 5-toothed, all subulate, densely tomentose externally. Corolla 7–8 mm long, the tube very short, the limb 2-lipped. Stamens included in the lower lip of corolla. Nutlets rounded, flattened, about 1 mm across.

Type specimen: Java, Besuki, Idjen plateau, *Backer* 36387 (L), July, 1917.

Distribution: Endemic to Malesia (Java).

Ecology: Common on lava rocks, altitudes 1,100–1,450 m.

Specimens examined:

Java: Idjen Plateau, alt. 1,100 m, *Backer* 36387 (L) (holotype); Idjen Plateau, alt. 1,450 m, *Koorders* 43207B (L) (Paratype); Idjen Plateau, alt. 1,100 m, *Steenis* 12008 (L, K) (very common on lava rocks; 1–1.5 m, high; very fragrant).

4. ***Plectranthus steenisii*** *sp. nov.*

Caule herbaceo erecto. Ramis dense villosis. Folia membranacea, ovata vel spatulato-obovata, crenato-dentata; 5–9 cm longa, 4–6.5 cm lata, acuta vel rotundata, basi acuta vel acuminata, integerrima; supra et subtus hirsuta, valde nervosa. Panicula parce ramosa, 25–30 cm longa. Verticillastri laxi, 20–30 flori. Pedicelli 2–4 mm longi, divaricati. Calyx campanulatus, 4 mm longis. Corolla 10–12 mm longis; tubo recto, supra gibbo ad medium; labiis superiore lobis quatuor, inferiore concavo. Stamina libera ad basin labii inferioria inserta. Stylus breviter bifidus. Achenia plano subrotunda, 1.2 mm longa et lata.

Type Specimen — Java: Res. Pasoerean, G. Ardjoeno, road between Sawahan Bahal and Sawahan Ardjoeno, on stony slope, alt. 2,650 m; dominant; leaves fragrant, flowers nice blue; *van Steenis* 7111 (L, duplicate K), June 1935.

This species is manifestly different from other Malesian species in the very long corolla which reaches a total length of 10–12 mm and in the corolla-tube which is conspicuously gibbous in the central portion above.

27

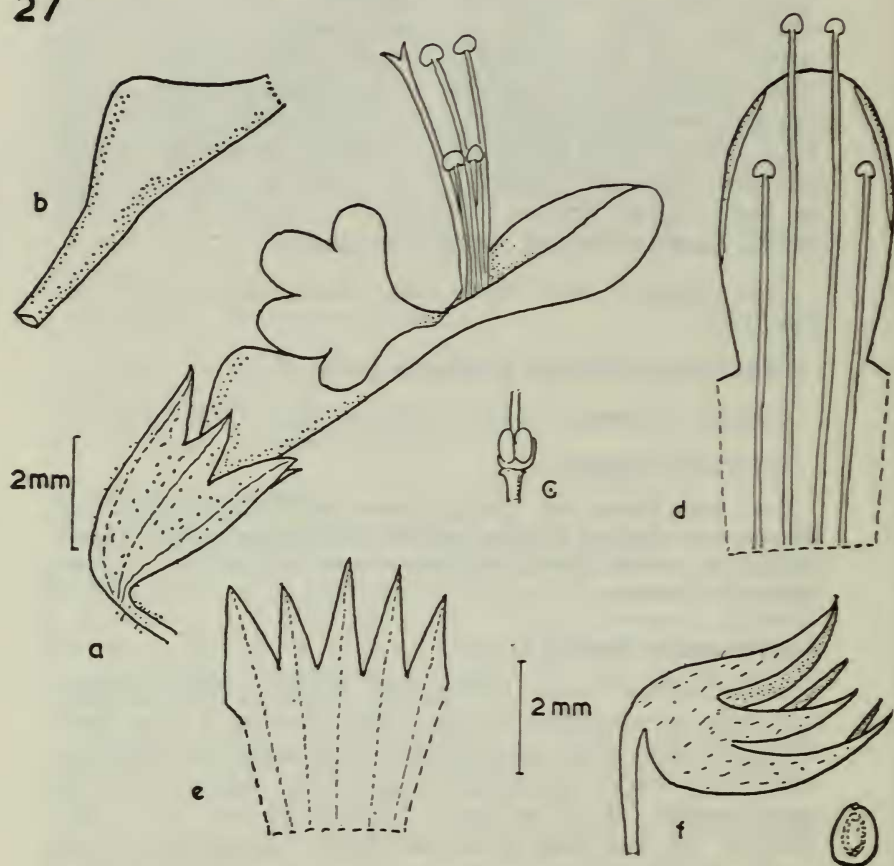


Fig. 27. *Plectranthus steenisii* H. Keng.

a. flower; b. portion of corolla showing the gibbosity; c. ovary and nectary disc; d. lower lip of corolla and stamens; f. fruiting calyx and nutlet. (*Steenis 7111*)

5. **Plectranthus apoensis** (Elmer) *comb. nov.*

Coleus apoensis Elm. Leaf. Philip. Bot. 7 (1915) 2694; Merr. Enum. Philip. (1923) 418.

Herb, 1–2 m high. Stems and branches erect and slender, obscurely angulate, puberulent. Leaves more or less succulent, deltoid ovate, 4–7.5 cm long, 5–6.5 cm broad, rounded, the base truncate, entire; margins elsewhere irregularly crenate or double-dentate; petioles 1.5–3 cm long, slender, hairy. Flowers 6–10 in a false whorl, forming lax spicate inflorescences disposed in a large terminal panicle, 20–25 cm long, 10–12 cm across; pedicels divaricate, 2 mm long. Calyx campanulate, 2.5 mm long, the upper tooth broad and 3 veined, the lower 4 teeth sharply pointed. Corolla 6–7 mm long; tube slender, crooked at about the middle, slightly gibbous near the base; limb 2-lipped, the upper lip recurved, the lower lip concave, notched. Stamens 4, attached on the throat of corolla, enclosed. Style shortly 2-fid.

Type: Philippines: Todaya (Mt. Apo), Davao, Minadanao, Elmer 11601, (isotypes, BM, K, L), Sept. 1909.

Distribution: Endemic to Malesia (The Philippines).

Ecology: Associated with grasses in thickets on fertile soil, along an open ridge at 1,000 m, altitude (Elmer).

Vernacular name: Calalapo-bulan (Philippines).

The four stamens of this plant are attached on the throat of the corolla nearly at the same level. They do not, however, form a filamental-tube as in *Coleus*, therefore I transfer it to the genus *Plectranthus*. Incidentally, Elmer described this plant under *Coleus* with uncertainty.

6. **Plectranthus congestus** R. Br. Prodr. (1810) 506; Benth. Lab. Gen. & Sp. (1832) 36, in DC. Prodr. 12 (1848) 66, Fl. Austral. 5 (1870) 79.

Tall herb, 1–1.5 m high. Stems and branches hoary-tomentose. Leaves membranaceous, ovate or elliptic, 2–6 cm long, 1.5–4 cm wide, obtuse, the base cuneate, entire; margins elsewhere undulate-crenate, tomentose on both surfaces; petioles 0.5–1 cm long. Flowers numerous (about 15–30) in dense clusters, forming false spikes and disposed in terminal panicles 15 cm or more long, and 5–8 cm across; pedicels subsessile, 1–2 mm long. Calyx villous and glandulate-dotted, 2 mm long (in fruit 2.5–3 mm long), declinate, 5-toothed; the upper tooth broadly ovate, obtuse, not decurrent, the lateral and the lower teeth subulate, acute, incurved. Corolla 6 mm long, declinate and slightly gibbous on the base of the upper side below the middle. Stamens inserted at different levels, 2 near the throat, 2 at the base of corolla. Nutlets rounded, flattened, subtriquetrous, 0.8 mm long and broad, glandulate-dotted.

Distribution: N. Australia and Malesia (New Guinea).

Ecology: in open places and thickets.

27a

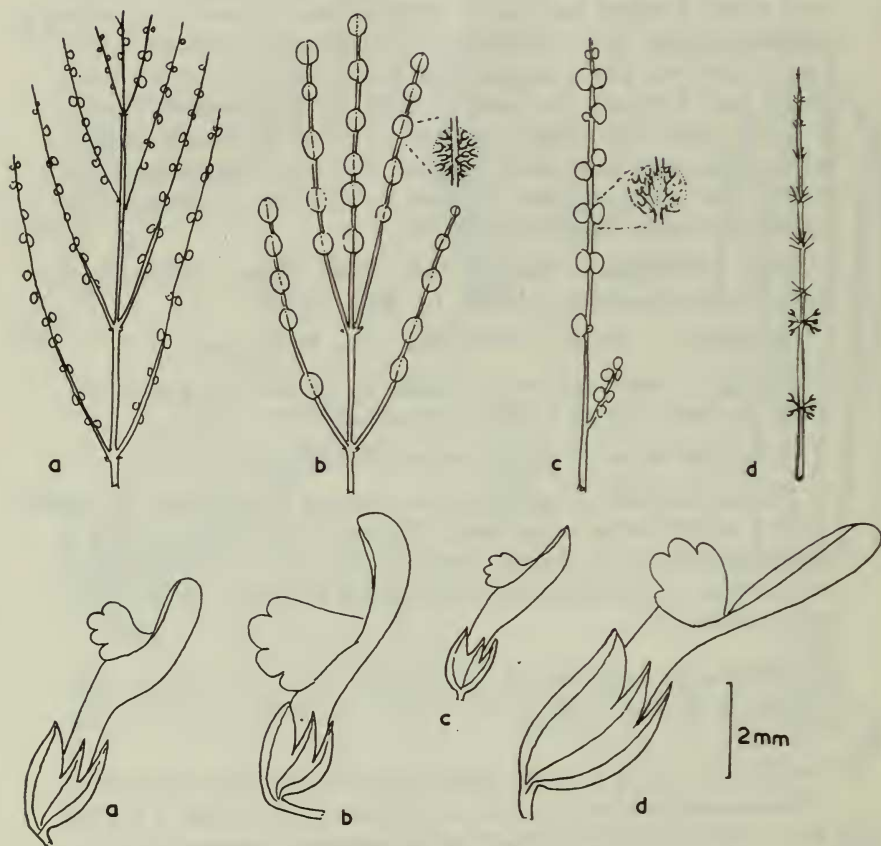


Fig. 27a. Diagrams of the inflorescences and sketches of the flowers of *Plectranthus* (1).

a. *P. opoensis*; b. *P. congestus*; c. *P. parviflorus*; d. *P. klossii*; (a. Elmer 11601; b. Brass 27602; c. Bünnenmeijer 8459; d. Brass 32392).

27b

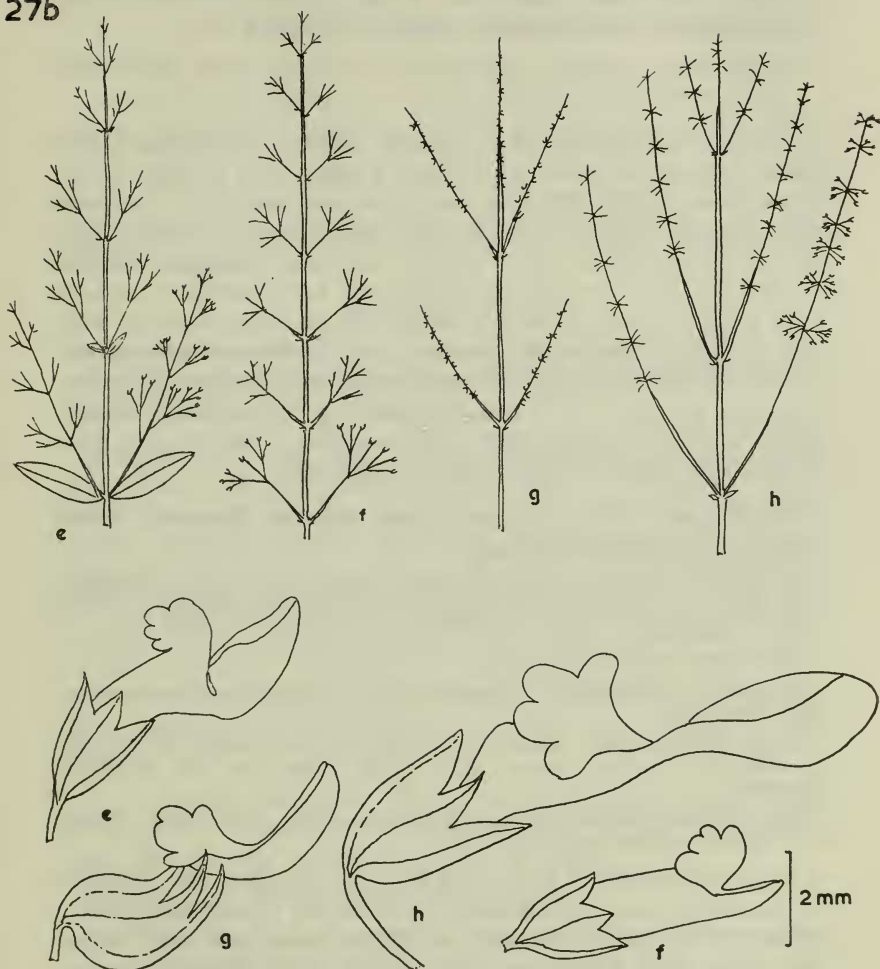


Fig. 27b. Diagrams of the inflorescences and sketches of the flowers of *Plectranthus* (2)

e. *P. javanicus*, f. *P. teysmannii*, g. *P. petraeus*, and h. *P. steenisii*.
(e. Horsfield Lab. 20; f. Zolf 218, g. Backer 36387, h. Steenis 7111).

Specimens examined:

New Guinea: Papua, *Brass* 27602 (K, L); *Womersley NGF 11010* (L) (herb, stems rather woody, flowers pale blue, above Rouna Falls, 20 miles from Port Moresby, C. Dist.).

7. ***Plectranthus parviflorus*** (*non* R. Br.) Willd. Hort. Berol. 1 (1806) t. 65; Benth. Lab. Gen. & Sp. (1832) 37, in DC. Prodr. 12 (1848) 67; Mansf. in Bot. Jahrb. 62 (1929) 379.

Craniotome versicolor (*non* Reichb.) van Steenis in Bull. Jard. Bot. Butg. III, 13 (1934) 221.

Erect herb or shrubby, 0.3–1 m high. Stems and branches rather fleshy, glabrescent to densely villous. Leaves thick or thin chartaceous, ovate to sub-orbicular, 2–2.5 (–9) cm long, 0.5–1 (–5) cm wide, broadly acute or rounded, the base rounded or subcordate, often slightly oblique, entire; margins elsewhere crenate or remotely crenulate, soft rugose or villous on both surfaces; petioles 0.5–1 (–3.5) cm long, woolly. Flowers 8–12 in dense clustered false whorls, laxly disposed in terminal and upper axillary racemes 15–30 (–35) cm long, simple or branched at the base; bracts cordate, caducous. Calyx 1.2–1.5 mm (in fruit 2.5–3 mm) long, densely villous and woolly, the upper tooth very broad, decurrent in fruit. Nutlets very minute, ovoid, about 0.8 mm long.

Distribution: N. E. Australia and Malesia (Sumatra, Lesser Sunda Isls., and New Guinea).

Ecology: Common on rocky steep slopes and limestone walls and cliffs, very aromatic (v. Steenis). Altitudes 500–2,000 m.

Specimens examined:

Sumatra: G. Kerintji, C. Sumatra, alt. 1,200–2,100 m, *Binnenmeijer 8459, 8720* (Bo).

Lesser Sunda Islands: Timor, *Forbes 3888* (BM, L); Timor, Mt. Perdido, alt. 800–1,200 m, *Van Steenis 18243* (BM); Timor, alt. 500 m, *Walsh 378* (BM).

New Guinea: Papua, Laloki River Rona, *Brass 3578* (BM); Papua, Port Moresby, *Womersley 11010* (K).

Binnemeijer 8459 & 8720 from Sumatra were formerly identified as *Craniotome vericolor* Reichb. [or correctly *Craniotome furcata* (Link.) O. Kuntz.]. Although the foliage leaves are much larger than those from Timor and New Guinea, their inflorescence and detailed flower structures are indistinguishable.

8. ***Plectranthus klossii*** S. M. Moore (incl. var. *major*) in Trans. Linn. Soc. London Bot. III ser. 9 (1916) 137 (Ridl. Bot. Wollast. Exp.); Mansf. in Bot. Jahrb. 62 (1929) 379.

Herb, 8–30 cm high, rarely branched. Stem covered with soft hairs. Leaves membranaceous ovate to broadly ovate, varying from 1–1.2 by 0.6–0.8 cm to 4.5–5.5 by 3.5–5 cm obtuse, the base rounded or truncate, entire; margins elsewhere crenate; puberulent on both surfaces. False whorls about 5–6 flowers, laxly disposed in terminal raceme-like inflorescence, 5–10 (–12) cm long, rarely branched at the base, bracts subulate, very minute, less than 1 mm long; pedicels 4–5 mm long. Calyx 2.5 mm (in fruit 4–5

mm) long, slightly oblique at the base; upper tooth broad, the remaining teeth lanceolate-subulate. Corolla 5.5 mm long; lower lip boatshaped, longer than the upper lip. Stamens exserted.

Type: W. New Guinea: Otakwa River to Mt. Carstensz, alt. 2,000–2,100 m Camp. ix-x, *Kloss s.n.* (Wallatos Exped.), (type, BM, K), Jan. 1913.

Distribution: Endemic to Malesia (Lesser Sunda Isls., and New Guinea).

Specimens examined:

Lesser Sunda Islands: Timor, Koepang, *Brown s.n.* April 1803 (BM); Timor, Soë, alt. 800 m, *Walsh s.n.* Dec. 1928 (BM) (fls. light blue-mauve).

New Guinea: Papua, *Brass 32362* (K, L); Otakwa River, Carstensz Peaks, alt. 2,000–2,100 m, *Kloss s.n. Jan. 1913* (BM, K) (Type of *Plectranthus Klossi* S. Moore); Otakwa River, Carstensz Peaks, alt. 1,600–1,800 m, *Kloss s.n. Jan. 1913* (BM) (Type of *Plectranthus Klossi* var. *major* S. Moore).

Doubtful species

Plectranthus kunstleri Prain in J. As. Soc. Beng. 66 (1897) 521, 74 (1907) 916, in Ann. Roy. Bot. Gard. Calc. 9 (1906) 54, *pl. 90*; Ridl. Fl. Mal. Pen. 2 (1923) 646.

Shrubby, 1–1.5 m high. Stems and branches angled, stout, puberulous. Leaves membranaceous, ovate or elongately ovate, 9.5–12 cm long 4–6 cm wide, acute or acuminate, the base cuneate, entire; margins elsewhere regularly crenate, sparsely glandular-puberulous beneath; petioles 2.5–3 cm long. Flowers in spurious racemes disposed in large panicles 11–14 cm long and 5–6 cm across; pedicels 4–5 mm long, finely puberulous. Calyx 2.5 mm (in fruit 6–7 mm) long, 5-toothed, the upper tooth ovate, recurved and decurrent, the two lateral ovate-acute and the two lower subulate. Nutlets oblong, 1.2 mm long, brown, hardly shining.

Type: Malay Peninsula: Perak, top of limestone hills, 130–200 m King's collector 8240, (Shrubby, 2–3 ft. long, leaves light green, flowers pale green) Sept. 1885. (K, BM).

Distribution: Malesia (Malay Peninsula).

Ecology: Known only from the limestone hills, at low altitudes.

The materials available are the two iso-types deposited in the herbaria at Kew and in the British Museum. Both are fruiting ones. The holotype, on which Prain's description and illustration of the flower are based, has not been seen. The foliage leaves and the fruiting calyx of this species strongly resemble those of *Coleus micranthus* Merr. of the Philippines.

28. POGOSTEMON DESF.

Pogostemon Desf. in Mem. Mus. Par. 2 (1815) 154, *t. 6*; Benth. in Benth. & Hook. f. 2 (1876) 1179; Briq. in E. & P. Pfl. Fam. 4, 3a (1897) 328.

Wensea Wendl. Coll. Pl. 3 (1819) 24, *t. 84*.

Herbs or undershrubs, often strongly scented. Leaves usually opposite. Flowers small, in simple or branched, spicate-racemose, formed of many densely flowered subcapitate false whorls. Calyx tubular or campanulate, subequally or equally 5-toothed. Corolla tubular, exserted; limb 2-lipped; upper lip 3-lobed, the central lobe usually longer and narrower than the lateral ones; the lower lip patent, entire. Stamens 4, exserted, usually straight, the lower pair often slightly shorter than the upper; anther-locules confluent; filaments pubescent. Disk subentire, uniform. Style shortly 2-fid, the branches subulate, subequal. Nutlets smooth, ovoid or ellipsoid.

Species 35–40, Eastern India to S. China and Japan and to Malesia; about 7 species in Malesia.

Key to the species.

- A. Spicate-racemes usually branched and forming a paniculate inflorescence.
 - B. False whorls distinctly apart (or spicate-racemes with distinct internodes).
 - C. Calyx 3–3.5 mm (in fruit 3.5–4 mm) long.
 - 1. *P. heyneanus*
 - C. Calyx 4–5 mm (in fruit 5.5–6 mm) long.
 - 2. *P. tomentosus*
 - B. False whorls nearly continuous, occasionally interrupted only at the base; calyx 4–4.5 mm (in fruit about 5 mm) long.
 - 3. *P. cablin*
 - A. Spicate-racemes usually simple, terminal, solitary, rarely accompanied by 1 or 2 short spicate-racemes at the base.
 - B. False whorls distinctly apart.
 - C. Calyx cylindric, 5–7 mm (in fruit 7–8 mm) long; teeth clasping.
 - D. Leaves oval-cordate, hirsute; flowers 3–6 (–8) in a false whorl.
 - 4. *P. reticulatus*
 - D. Leaves oblong-ovate to ovate, nearly glabrous; flowers 10 or more in a false whorl.
 - 5. *P. philippinense*
 - C. Calyx campanulate, 4–4.5 mm (in fruit 5–5.5 mm) long; teeth often spreading.
 - 6. *P. menthoides*
 - B. False whorls nearly continuous, occasionally interrupted only at the base; rachis densely tomentose or hairy.
 - 7. *P. velatus*
1. ***Pogostemon heyneanus*** Benth. in Wall. Pl. As. Rar. 2 (1831) 16, Lab. Gen. & Sp. (1833) 154 (as *heyneanum*), in DC. Prodr. 12 (1848) 153; Miq. Fl. Ind. Bat. (1859) 961; Prain in J. As. Soc. Beng. 74, 2 (1907) 707; Merr. Enum. Philip. 2 (1923) 414; Ridl. Fl. Mal. Pen. 2 (1923) 647; Mukerj. in Rec. Bot. Surv. Ind. 14, 1 (1940) 71; Back. & Bakh. f. Fl. Java 2 (1965) 633.
- Pogostemon patchouli* (non *P. patchouly* Pellet.) Hook. f. Fl. Brit. Ind. 4 (1885) 633. (excl. var. *suavis* Hook. f.).

Erect branching herb, 1–1.5 m high. Stems and branches slender, sparingly pubescent. Leaves thin membranaceous, ovate to broadly ovate, 5–8 cm long, 3.5–5.5 cm wide, acute, the base broadly cuneate, often slightly oblique, entire, margins elsewhere crenate or double-crenate; sparingly puberulous or sometimes almost glabrous on both surfaces; petioles 1–3 cm long, puberulous. Paniculate inflorescence 6–10 cm long, terminal; false whorls globular, 0.5–1.5 cm apart at the base, more approximate upwards; bracts narrowly lanceolate, 3–3.5 mm long, acute, puberulous. Calyx 3–3.5 mm (in fruit 3.5–4 mm) long, tomentose externally; teeth equal, triangular. Corolla 4.5–5 mm long, 2-lipped, glabrous. Filaments exserted, almost straight, all bearded. Style shortly 2-branched. Nutlets obliquely ovoid, 0.5–0.6 mm long, black, smooth.

Type: E. India, *Heyne s.n.* (K).

Distribution: India, Ceylon and Malesia.

Ecology: In thickets, old clearings, etc., at low to medium altitudes. Cultivated or as an escape from cultivation.

Vern. names: Patchouli (Sumatra); Ruku, Pakochilam, Poko Nyao, Rumput Kuku (Malay Peninsula), Kadlum, lagumtum (Philippines).

Specimens examined:

Sumatra: E. Sumatra, *Beccari 600 & 662* (K); W. Coast, alt. 900 & 1,500 m, *Bünnemeijer 8123* (K, L) & *9057* (L); Lampong, alt. 400 m, *Iboet 105* (K, L); Berastagi, alt. 1,350 m, & 1,500 m, *Lörzing 6792* (K, L) & *13844* (L); Deli, *Lörzing 15829* (L); E. Sumatra, *Ridley 11334* (K); Sandaran Agong, *Robinson & Kloss s.n.* May 1914 (K); Padang, *Toroes 5635* (L).

Malay Peninsula: Sembilan, *Alvins 880 & 1088* (Sing.); Sungei Ujong, *Alvins 1937 & 2240* (Sing.); Malaya Pen., *Griffith 3966 & 3970* (K, Sing.); Malacca, *Griffith s.n.* (K); Penang, *Haniff s.n. Feb. 1920* (Sing.); Teku, G. Tahan, *Haniff 8031* (Sing.); Pahang, near Kuala Toku, *Holtum 20816* (Sing.); Selangor, *Ridley 7603* (K, Sing.); Perak, *Ridley 14300 a* (Sing.); Pahang, Kuala Toku, *Seimund 485* (Sing.); Upper Perak, *Wray 4046* (Sing.).

Java: Buitenzorg, *Bakhuizen v/d Brink 1753 & 3654* (L); Java, *Horsfield lab. 17* (K); Kota Batoe, *Monchy s.n.* (L); Tjibodas, *Schaffer s.n.* (L).

Borneo: Sarawak, *Beccari 1747 & 2747* (K); Sarawak, Pen Kulu Ampat, *Haviland s.n.* (Sing.); Borneo, Bandjarmassing, *Motley 392* (K); Sarawak, Lundu, *Ridley 12381* (K).

Philippines: Palawan, *Bermejos 287* (K); Mindanao, alt. 450 m, *Frcke 38323* (L); Mindanao, Zamboanga, *Merrill 5467* (K) & *8238* (K, L); Mindanao, *Ramos & Edano 36972* (L).

2. *Pogostemon tomentosus* Hassk. Hort. Bogor. (1858) 131; Benth. in DC. Prodr. 12 (1848) 153; Miq. Fl. Ind. Bat. (1859) 962.

Perennial, erect herb, branched. Stems and branches slender, tomentose. Leaves thin or thick membranaceous, puberulous above, densely tomentose beneath, oblong-ovate or ovate, 5–9 (–14) cm long, 3.5–6 (–10) cm wide, acute, the base obliquely rounded, entire; margins elsewhere incisely serrate or partly double-serrate. Spicate-racemes few or several, forming terminal panicles; false whorls 10-many-flowered, more or less apart at the base, closely approximate upwards; bracts linear lanceolate, 3–6 mm long.

Calyx tubular, 4–5 mm (in fruit 5.5–6 mm) long, pilose. Corolla 5.5–6 mm long, 2-lipped. Filaments shortly exserted, woolly below. Seeds subrounded, 0.6 mm long, 0.5 mm broad, obscurely 3-angled, black.

Type specimen: Java, Buitenzorg, *Hasskarl s.n.* (not seen)

Distribution: Malesia (Java ?, Lesser Sunda Isls., the Philippines, Celebes).

Specimens examined:

Lesser Sunda Islands: Soemba, *Teysmann 8814* (K, L); Bali, *Voogd 2187* (L).

Philippines: Luzon, Mt. Arayat, *Ramos 22432* (K, L).

Celebes: S. W. Celebes, *Eyma 3301* (L); Celebes, *Teysmann 12601* (L); Tjamba, *Teysmann 12620* (L); Baleh-Angien, *Teysmann 8814* (K, L).

Type specimen of this species was not available for examination. The identification of the Celebes and Lesser Sunda Islands specimens as belonging to this species was made by Boerlage (in Herb. Leiden), on which the above descriptions were drawn. One notable feature is that no available specimens from Java can be referred to this species. It is also not included in Backer and Bakhuizen's Flora of Java Vol. 2, (1965).

3. ***Pogostemon cablin*** (Blanco) Benth. in DC. Prodr. 12 (1848) 146; Miq. Fl. Ind. Bat. 2 (1859) 964; Prain in J. As. Soc. Beng. 74, 2 (1907) 708, in Kew Bull. (1908) 78; Merr. Enum. Philip. 3 (1923) 414; Back. & Bakh. f. Fl. Java 2 (1965) 633.

Mentha cablin Blanco, Fl. Filip. (1837) 473.

Meniha auricularia (non Linn.) Blanco, op. cit. ed. 2 (1845) 329, ed. 3, 2 (1878) 245.

Pogostemon patchouly Pellet. in Mem. Soc. Sc. Orleans 5 (1845) 277, t. 7;

Pogostemon patchouly Pellet. (as *patchouli*), var. *suavis* Hook. f. Fl. Brit. Ind. 4. (1885) 634.

Pogostemon patchouli Hook. in Kew J. Bot. 1 (1849) 328, t. 11.

Pogostemon comosus Miq. Fl. Ind. Bat. (1859) 963. *syn. nov.*

Pogostemon neptoides Stapf. in Kew Bull. (1908) 116; Merr. in Philip. J. Sc. 7 (1912) Bot. 347 (incl. var. *glandulosus*), Enum. Philip. 3 (1923) 414. *syn. nov.*

Pogostemon battakianum Ridl. in J. R. As. Soc. Mal. Br. 1 (1923) 85. *syn. nov.*

Pogostemon javanicus Backer ex Adelb. in Reinwardtia 3 (1954) 150, f. 1. Back. & Bakh. f. Fl. Java 2 (1965) 632, *syn. nov.*

Erect herb, branched, 50–100 cm high. Stem and branches densely tomentose. Leaves thin or thick membranaceous, narrowly ovate or ovate, 7–10 (–13) cm long, 5–6.5 (–7) cm wide, acute, the base cuneate-rounded to truncate, entire; the margins elsewhere incisely dentate or crenate; petioles 1–3.5 cm long, tomentose. Spicate-racemes 3 or many forming a terminal panicle, 15–30 (–40) cm long; false whorls slightly apart below, closely approximate

above; bracts elliptic or narrowly ovate, 2–7 mm long. Calyx tubular, 4–5 mm (in fruit 5–6 mm) long, narrowed at both ends, hirsute to strigose, equally 5-toothed. Corolla 6–7 mm long, 2-lipped. Filaments soft hairy. Style 2-branched at the apex. Nutlets ellipsoid, 1 mm long, 0.6 mm broad, subtriquetrous, smooth.

Distribution: India, Ceylon and Malesia.

Ecology: Occasionally cultivated or escaped from cultivation and occurring in areas remote from settlement.

Vern. names: Kabiling, Kadlum, Karlin, Sarok (Philippines, fide Merrill).

Specimens examined:

Sumatra: W. Coast, alt. 1,550 m, *Bünnemeijer* 8811 (L); G. Kerintji, alt. 1,900 m, *Bünnemeijer* 9612 (K, L); Berastagi, *Ridley* s.n. Feb. 1921 (K) (Type of *Pogostemon battakianun* Ridl.).

Malay Peninsula: Selangor, *Collector unknown*, s.n. May 1932 (K).

Java: Bogor, *Hallier* 303 (L); Buitenzorg, Garden, *Holmes* s.n. 1896 (K); Banjoemas, *Horsfield* s.n. (U 69535) (Type of *Pogostemon comosus* Miq.); Banjoewangi, *Zollinger* 4651 (L) (Type of *Pogostemon javanicus* Backer).

Lesser Sunda Islands: Sumbawa, *Elbert* 3677 (L).

Philippines: Luzon, Rizal, *Ahern's Collector* 2443 (K, Sing.); Luzon, *Loher* 4211 (K); Luzon, Rizal, *Merrill* sp. Blanc. 112 (K, L); Luzon, *Merrill* 5025 (K); Luzon, Ilocos, alt. 1,000 m, *Merritt & Darling* 12479 (K); Philippines, *Micholitz* s.n. (K) (Type of *Pogostemon nepetoides*); Luzon, Rizal, *Ramos* 1849, 2061, 2130 & 5199 (K); Luzon, Pampanga, *Ramos* 22432 (K); Luzon, Rizal, *Reillo* 19292 (K, L); Philippines, *Vidal* 505 (K, L).

4. *Pogostemon reticulatus* Merr. in Philip. J. Sc. 8 (1912) Bot. 348, Enum. Philip. 3 (1923) 415.

Erect branched herb, 50–75 cm high. Stems and branches puberulent, scattered with long white hairs. Leaves thin membranaceous, 5–10 cm long, 3.5–7 cm wide, obtuse or shortly acuminate, the base rounded or cordate; margins coarsely and irregularly crenate, ciliate on both surfaces; petioles 3–6 cm long. False raceme terminal, solitary, 6–15 cm long including the peduncle; false whorls 3–8 flowered, internodes 1–2 cm long, more or less evenly apart; bracteoles filiform, 2 mm long, puberulent, ciliate. Calyx tubular, 4.5–6 mm long, puberulent and very sparingly pilose, narrowed at both ends; the teeth oblong-lanceolate, ciliate.

Type: Luzon, Rizal, Montablan, *For. Bur.* 3395 *Ahern's collector* (K, L).

Distribution: Malesia (the Philippines).

Ecology: In thickets or forests at low or medium altitudes.

Vern. names: Kadling (the Philippines).

Specimens examined:

Philippines: Luzon, Rizal, Montablan, *Ahern's Collector* 3395 (K, L) (Type); Rizal, San Andales, *Edano* 48842 (K, L); Luzon, Mariveles, *Loher* 4207 (K) (Fls. lilac); Luzon, *Loher* 6690 (K); Luzon, Laguna, San Antonio, *Ramos* s.n. Aug. 1910 (K); Philippines, *Vidal* 3487 (K, L).

Loher 4207 deviates from the typical form of the species in the conspicuously pedunculate verticillasters. They are normally sessile.

5. **Pogostemon philippinensis** S. M. Moore in J. Bot. 43 (1905) 146; Merr. in Philip. J. Sc. 5 (1910) Bot. 381, Enum. Philip. (1923) 415.

Pogostemon membranaceus Merr. in Philip. J. Sc. 7 (1912) 347, Enum. Philip. 3 (1923) 414. *syn. nov.*

Erect herb, 50–75 cm high, branched. Stems and branches puberulent. Leaves thick or thin membranaceous, oblong-ovate to ovate, 3–9 cm long, 2.5–5 cm wide, acuminate, the base rounded, entire; margins elsewhere serrate or double-serrate; glabrescent above, glandulate-punctate beneath; petioles 1–3 cm long, puberulent. Spicate-raceme terminal, solitary, 4–12 cm long; false whorls 10-many-flowered, more or evenly apart; bracts linear lanceolate, pubescent, caducous. Calyx tubular, 5–6 mm (in fruit 6–7 mm) long, sparingly pubescent and glandular-punctate. Corolla slender, glabrous, 9–10 mm long. Filaments exserted, bearded below the middle. Nutlets ovoid, 0.6–0.7 mm long, obscurely triquetrous, smooth.

Type: Luzon, Prov. of Ilo-ilo, *Vidal 3421*, (K) March. 1886.

Distribution: Malesia (the Philippines).

Ecology: In thickets or forests along streams at low or medium altitudes.

Vern. names: Legleg, Ngingiyau, Panga-ti-Nuang (Philippines).

Specimens examined:

Philippines: Luzon, Lepanto, *Merrill 4501* (K); Luzon, Pampanga, *Merrill 11210* (K); Luzon, Abra, *Ramos 7267* (K); Luzon Laguna, *Ramos 16419* (L) (Co-type *Pogostemon membranaceus* Merr.); Luzon, Laguna, San Antonio, *Ramos 16596* (K); Luzon, Baguio, *Ramos 27404* (K, L. Sing.); Luzon, Ilocos, Mt. Palimlim, *Ramos 33320* (K); Luzon, Cagayan Peninsula, *Ramos & Edano 46599* (Sing.); Luzon, Rizal, Mt. Irig, *Ramos & Edano 48558* (K); Luzon, Benguet, Pauai, *Santos 31792* (K); Mindoro, Mt. Yagaw, alt. 500 m, *Sulit & Conklin 16927* (L); Luzon, Bontoc, *Vanoverbergh 208* (L); N. Luzon, *Vidal 1655 & 1659* (K); Panay, Iloilo, Miagao, *Vidal 3421* (K) (Type of *Pogostemon philippinensis* Moore).

A co-type of *Pogostemon membranaceus* Merr. has been examined. It differs from *P. philippinensis* Moore merely in the thinner and somewhat broader leaves.

6. **Pogostemon menthoides** Bl. Bijdr. (1826) 825; Benth. Lab. Gen. & Sp. (1833) 156, in DC. Prodr. 12 (1848) 155; Miq. Fl. Ind. Bat. 2 (1859) 963; Back. & Bakh. f. Fl. Java 2 (1965) 632.

Pogostemon fraternus Miq. Fl. Ind. Bat. 2 (1859) 963. *syn. nov.*

Erect branched herb, 50–100 cm high. Branches pubescent. Leaves thick membranaceous, lanceolate to ovate, 1–5 (–8) cm long, 0.7–3 (–5) cm wide, acute, the base acute or rounded, often slightly oblique; margins often doubly serrate or incised-serrate in larger ones; sericeous on both surfaces; petioles 0.5–1 cm long, pubescent. Spicate-raceme terminal, solitary, 3–15 cm long; false whorls 3–12 flowered, evenly apart; bracts linear, minute. Calyx campanulate, strigose, 4–4.5 mm (in fruit 5–5.5 mm) long, 5– (occasionally 7–) toothed; teeth lanceolate, sharply pointed, often spreading. Corolla 6–7 mm long, 2-lipped, sparingly puberulent.

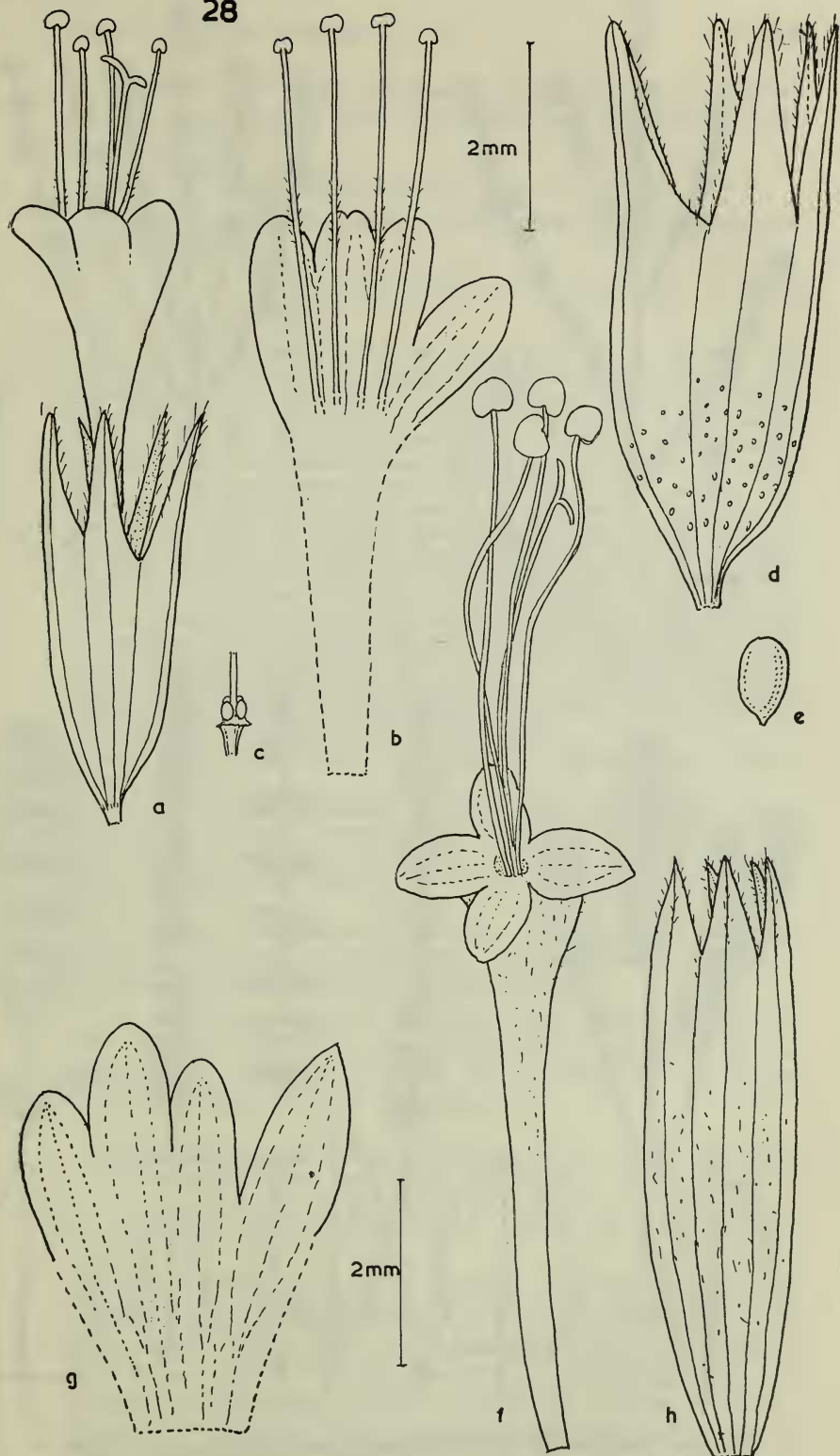


Fig. 28. *Pogostemon menthoides* Bl. (a-e) and *P. philippinense* S.M. Moore (f-h).

a. flower; b. corolla expanded showing the stamens; c. ovary; d. fruiting calyx; e. nutlet; f. corolla and stamens; g. upper portion of corolla expanded; h. calyx. (a-c, *Boelage s.n.*; d & e, *Blume s.n.*; f-h, *Ramos 16419*).

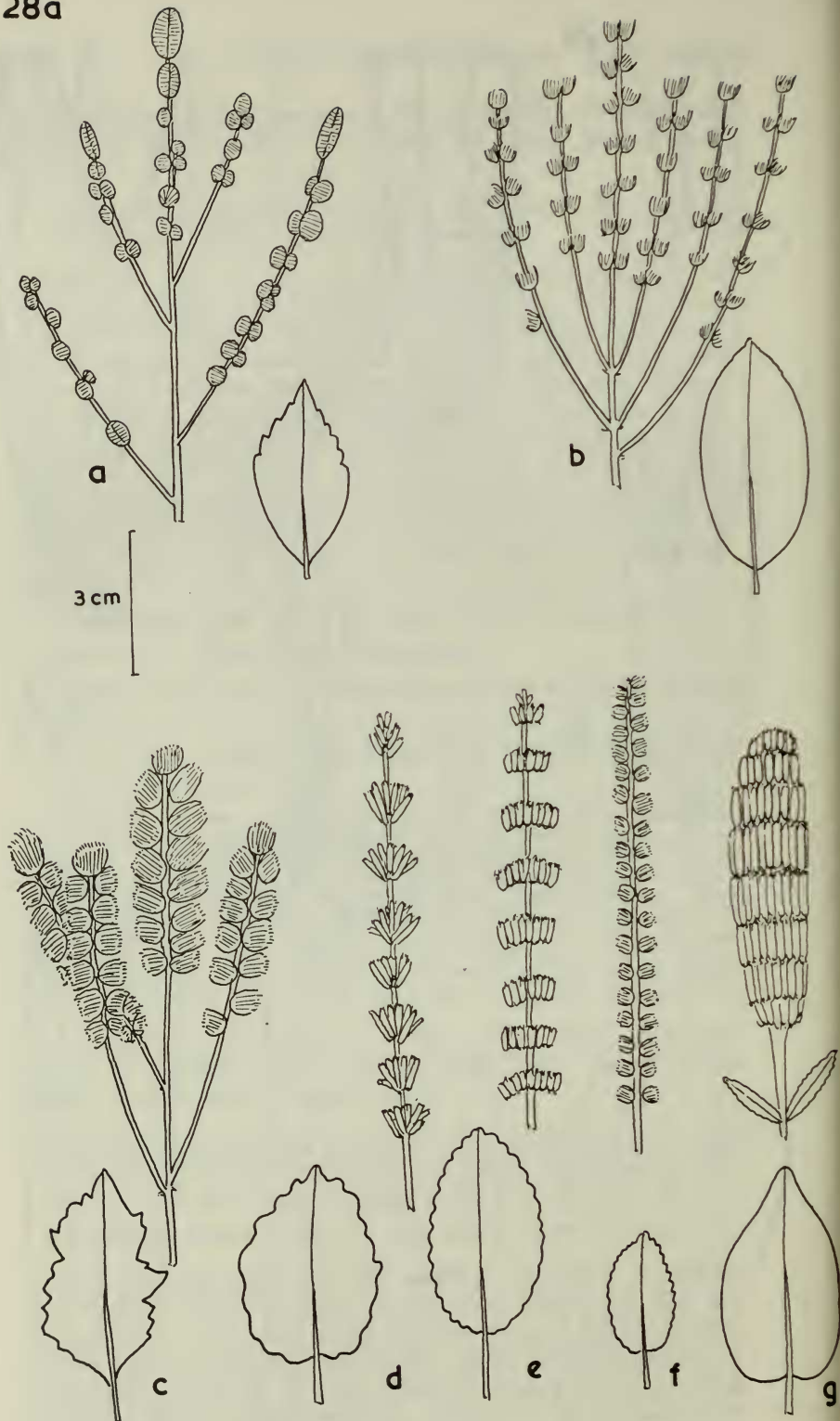


Fig. 28a. Diagrams of the inflorescences and sketches of the leaves of *Pogostemon*.

a. *P. heyneanus* Benth.; b. *P. tomentosus* Hassk.; c. *P. cablin* Benth.; d. *P. reticulatus* Merr.; e. *P. philippinense* S.M. Moore; f. *P. menthoides* Bl.; g. *P. velatus* Benth. (a. Bakhuizen v.d. Brink 3654; b. Teysmann 12601; c. Vidal 505; d. Ahem's collection; e. Ramos 16419; f. Koorders 44057; g. Cuming 1097).

Filaments exerted, bearded below the middle. Nutlets subglobose, 0.6 mm long and 0.5 mm across, obscurely 3-angulate, black, finely reticulate.

Type: Mt. Gede, *Blume s.n.* (L).

Distribution: Malesia (Java, Lesser Sunda Islands, Borneo and the Philippines).

Ecology: In damp forests, altitude 1,500–2,500 m.

Specimens examined:

Java: G. Widodaren alt. 1,750 m, *Backer 3715* (L); G. Tjeremai, alt. 1,500 m, *Backer 4898* (L); G. Gedeh, alt. 2,000 m, *Backer 13721* (L); G. Hayang, alt. 2,200 m, *Backer 9845* (L); Preanger, alt. 1,620 m, *Backhuizen v/d Brink 4559* (K, L); Tjibodas, *Boerlage s.n.* 1917 (L); G. Papandajan, *Burck s.n.* July 1891 (K, L); G. Gede, *Blume s.n.* (lectotype of *Pogostemon menthoides* Bl.); G. Gedeh, *Clemens 30434* (K); G. Gedeh, *Hallier 480* (L); G. Gede, *Hochreutiner 828* (L) (Herb 0.5 m; fls. violet); Java, *Horsfield 1141* (K) (Type of *Pogostemon fracterus* Miq.); G. Gedeh, alt. 1,650 m, *Kern 8301* (L) (Corolla light purple; fil. dark purple; style less purplish); Tjibodas, alt. 2,000 m, *Koorders 25846 & 31075* (L); Besoeki, alt. 2,000 m, *Koorders 43203* (K, L); G. Delaman, alt. 1,600 m, *Koorders 43205* (L); G. Ardjoeno, alt. 2,000 m, *Koorders 44057* (L); G. Wilis, alt. 2,000 m, *Kuntze 5871* (K); G. Prahoe, alt. 2,100–2,500 m, *Loogen 11* (L); G. Kentjana, *Native Collector 345* (L); Tjibodas, *Pleyte 119* (L) (Herb 70 cm fls. lilac); Tjibodas, alt. 1,400 & 1,500 m, *Raap 646 & 718* (L); Wajang, *Rant 608* (L); Tjibodas, *Sapiin 2479* (L); G. Kentjana, *Soegandiredjo s.n.* April 1909 (L); G. Patoeha, alt. 1,600–2,000 m, *Steenis 4422* (L); Kandangbakak to Tjibeureum, *Yates 2873* (Sing.)

Lesser Sunda Islands: Bali, *Steenis 7887* (K, Sing.); Bali, alt. 1,700 m, *Voogd 2766* (L).

Borneo: N. Borneo, Kinabalu, Silan Basin, alt. 1,700–2,700 m, *Clemens 29727* (K, L); Kinabalu, Penaturan River, alt. 1,200 m, *Clemens 32575* (L)

Philippines: Luzon, Ilocos, Mt. Quebrada, alt. 1,000 m, *Edano 3953* (L); Luzon, Mt. Darna, alt. 1,000 m, *Edano 6057* (L); Luzon, Mt. Tonglon, *Ramos 5415* (L).

Descriptions of *Pogostemon fraternus* Miq. was based on Horsfield's collection from G. Praoe, Java. A type specimen in the Kew Herbarium is identical with *P. menthoides* Bl.

Two specimens collected by Edano from Luzon (*Nos. 3953, 6057*) probably represent a new variety. It is characterized by the much longer inflorescence (up to 20 cm long) and the denser verticils consisting of over 20 flowers.

7. *Pogostemon velatus* Benth. in DC. Prodr. 12 (1848) 155; Miq. Fl. Ind. Bat. 2 (1859) 964; Merr. Enum. Philip. 3 (1923) 415.

Pogostemon williamsii Elmer, Leaflet. Philip. Bot. 9 (1934) 3197, syn. nov.

Perennial branching herb or shrubby, 1 m high. Stems and branches stout, densely tomentose. Leaves thick membranaceous, lanceolate to broadly ovate, 3–8–11 cm long, 1.5–4 (–5) cm wide, acute or acuminate, the base rounded or cordate, the margins remotely double-serrate, densely velutinous on both surfaces; petioles 1–3 cm long. Spicate-raceme terminal and solitary, 5–12 (–15) cm long; false whorls 12-many flowered, closely approximate. Calyx tubular, 5 mm long (in fruit 6–6.5 mm long, the mouth enlarged), sparingly pilose; teeth 5, broadly lanceolate, ciliate.

Corolla slender, 7–8 mm long, pilose externally. Filaments exserted, hairy below. Nutlets subspherical, 0.6 mm long, and 0.5 mm across, black, smooth.

Type: Luzon, Insul. Philippines, *Cuming 1097* (K, L) 1841.

Distribution: Malesia (the Philippines).

Ecology: In ravines, thickets, etc. altitude 1,200–1,800 m.

Vern. names: Dila, Opop, Sipan-ti-bayungan (Philippines).

Specimens examined:

Philippines: Luzon, *Cuming 1097* (K, L) (Type of *Pogostemon velatus* Benth); Luzon, Alba, *Darling 16566* (L); Luzon, Benguet, *Elmer 5912* (K); Luzon, Benguet, Baguio, *Elmer 8385* (K, L); Luzon, Pampanga, Mt. Pinatubo, *Elmer 22225* (K, L, Sing.) (Type of *Pogostemon williamsii* Elm); Luzon, *Lohr 4208, 4209 & 4210* (K); Luzon, Nueva Vizcaya, *McGregor 11339* (K, L); Luzon, Benguet, *Mendoza 20362* (L); Luzon, Benguet, Mt. Abbocot, *Mendoza 40923* (K, L); Luzon, Benguet, Baguio, *Merrill 4778* (K); Luzon, Baguio, *Merrill 11673* (K, Sing.); Luzon, Zambales, Anuling, *Ramos & Edano 44557* (Sing.); Luzon, Cagayan, Penablanca, *Ramos 76828* (Sing.); Luzon, Baguio-Bontoc, *Steenis 17914* (L); Luzon, Mt. Pauai, *Sulit 7535* (L); Luzon, Bontoc, *Vanoverbergh 157* (L); Luzon, Benguet, *Vidal 1660* (K); Luzon, Benguet, Baguio, *Williams 1353* (K).

The type specimen of *Pogostemon williamsii* Elmer has been studied, it differs from *P. velatus* Benth. mainly in the narrower inflorescence (1–1.5 cm across vs. 2–2.2 cm across) and the narrower leaves (lanceolate vs. cordate). Their basic flower structures, however, are very similar.

Species imperfectly known

Pogostemon cristatus Hassk. in Hoev. & De Vriese, Tijdschr. 10 (1843) 121; Back. & Bakh. f. Fl. Java 2 (1965) 633.

According to Backer and Bakhuizen van den Brink Jr., this species is closely allied to *Pogostemon heyneanus* Benth., "from which it may be distinguished by the larger dimensions of the flower." No materials are available for the present study.

29. SALVIA [TOURN.] LINN.

Salvia [Tourn.] Linn. Gen. Pl. ed. 5 (1754). Sp. Pl. (1753) 23; Benth. in Benth. & Hook. f. Gen. Pl. 2 (1876) 1194; Briq. in E. & P. Pfl. Fam. 4, 3a (1897) 270.

Herbs, undershrubs, or shrubs. Leaves opposite, cauline or almost all radical, simple or pinnatifid. Flowers small to large and showy; false whorls in terminal and axillary racemes; bracts small or large, sometimes brilliantly coloured in cultivated forms. Calyx campanulate or tubular, 2-lipped; upper lip entire or 3-fid; lower lip notched or 2-toothed. Corolla 2-lipped; tube naked or annulate within; upper lip erect; lower lip 3-lobed, the central lobe usually wider than the lateral ones, entire or emarginate. Fertile stamens 2, representing the lower pair; filaments short, articulating with a slender connective, and sometimes produced beyond the joint; connective linear, transverse, with an upper ascending arm which bears a linear fertile anther-locule, and a lower straight or deflexed branch bearing a reduced anther-locule or empty. Disk usually

enlarged anteriorly. Style shortly 2-fid; the lobes usually subulate, equal or the lower larger, sometimes flattened. Nutlets ovoid, often triquetrous, smooth.

About 500 species, widely distributed in temperate and sub-tropical regions of the World, only 2 species are perhaps native to Malesia; several other species are often cultivated in the gardens*, one of them, *S. coccinea*, var. *pseudococcinea*, sometimes escapes from cultivation.

Key to the species

- A. Dwarf rhizomatous herb, usually below 20 cm high; leaves nearly all radical, always pinnatifid; style branches nearly equal. 1. *S. scapiformis*
- A. Erect herbs, often above 30 cm high; leaves cauline, simple and entire; style branches unequal, the upper ones very short.
 - B. Inflorescence paniculate; flowers bluish violet, minute, inconspicuous; corolla-tube short, not exserted. 2. *S. plebeia*
 - B. Inflorescence racemose; flowers red, rather large, showy; corolla-tube long, exserted. 3. *S. coccinea* var. *pseudococcinea*

1. *Salvia scapiformis* Hance in J. Bot. 23 (1885) 368 in Bot. Mag. t. 6980; Merr. in Philip. J. Sc. 5 (1910) Bot. 228, Enum. Philip. 3 (1923) 413 (as *S. scapiformis*); Kudo in Mem. Fac. Sc. & Ag. Taihoku Un. 2, 2 (1929) 175.

Dwarf rhizomatous herb, usually 10–20 cm high. Leaves very variable, nearly all radical, odd-pinnatifid, ovate or broadly ovate in outline, 5–10 (–18) cm long; leaflets often 5, sometimes 3 or 7, rarely simple; terminal leaflets the largest, ovate, 1–4 cm long, 0.8–3 cm wide, acute, the base rounded or cordate, entire, the margins crenate-serrate, or few-toothed in the lateral ones, glabrescent on both surfaces; petioles very slender, 4–10 cm long. Flowers 4–7 in a false-whorl, the whorls 1–1.5 cm apart, in raceme-like inflorescence borne on a terminal scape. Calyx tubular-campanulate, 5–5.5 mm (in fruit 7–9 mm) long, sparsely pilose, 2-lipped; upper lip broad deltoid, entire; lower lip sharply 2-toothed. Corolla 8–9 mm long, exserted; tube annulate within; upper lip erect, emarginate; lower lip shorter, 3-lobed. Stamens exserted, lower connective-branches reduced. Style shortly 2-branched, the branches nearly equal. Nutlets ellipsoid, 2 mm long and 1 mm broad, subtriquetrous.

Type specimen: Tam Sui, Ins. Formosa, *C. Ford* (Herb. Propr. 22314), June, 1884 (K).

Distribution: Western China, Formosa, and Malesia (The Philippines).

* A key to 13 cultivated species and varieties in Java can be found in Backer & Bakhuizen, Fl. Java. 2 (1965), pp. 625–628.

Specimens examined:

Philippines: Mt. Picode-Loro, Ilocos, Luzon, alt. 500 m, *Edano 17973* (L); Banguio, Benquet, Luzon, *Elmer 5834* (K), 8637 (K, L); Burgos, Ilocos, Luzon, *Ramos 27184* (K); Mt. Nagapatan, Ilocos, Luzon, *Ramos 33145* (L, Sing); Umiray, Tayabas, Luzon, *Ramos & Edano 29046* (K); Mt. Suson-Dalaga, Rizal, Luzon, *Ramos & Edano 29415* (K); Mt. Data, Lepanto, Luzon, *Ramos & Edano 40256* (K, L) 40233 (K, isotype of *Salvia philippinensis* Merr. probably an unpublished binomial).

This is possibly a true native species of *Salvia* in the Malesian region.

2. *Salvia plebeia* R. Br. Prodr. (1810) 501; Benth. in DC. Prodr. 12 (1848) 355; Miq. Fl. Ind. Bat. 2 (1859) 970 (as *S. plebeja*); Prain in J. As. Soc. Beng. 74 (1907) 713; Merr. Enum. Philip. 3 (1923) 413.

Salvia violacea (non Ruiz & Pav.) Blanco Fl. Filip. (1845) 14, ed. 3, 1 (1877) 27.

Erect herb, 40–60 cm or more high. Stems 4-angled, grooved, tomentose or glabrescent. Leaves membranaceous, sparsely hirsute or nearly glabrous, very narrowly elliptic or narrowly ovate, 2–4 cm long, 0.8–1.5 cm wide, sub-acute or obtuse, the base usually cuneate, entire; margins elsewhere crenate; petioles 2–4 cm long, hirsute. False racemes terminal and in upper leaf-axils, often forming large panicles; flowers 4–10 in a false whorl; bracts small, linear-spathulate; pedicels 1–2 mm long, hairy. Calyx campanulate, 2 mm (in fruit 2.5 mm) long, densely tomentose and glandulate, 2-lipped; upper lip obtuse, often shortly 3-fid at the tip; lower 2-toothed, the teeth acute. Corolla small, 3–3.5 mm long, shortly exserted; upper lip oblong, obtuse; lower lip 3-lobed, the mid-lobe exceeding the lateral ones. Nutlets ovoid, 1 mm long, 0.7 mm broad, brown, rugose.

Type specimen: Nova Hollandia tropica, R. Brown, s.n. (BM).

Distribution: Southeastern Asia to Australia.

Ecology: A weed occurring at low altitudes, rather rare.

Vern. name: Ruku-ruku begal (Sumatra).

Specimens examined:

Sumatra: Karo Lands, alt. 1,350 m, *Lörzing 5921* (L); Karo Lands, Biang Valley, *Lörzing 14502* (L) (Herb, 40 cm, lvs. aromatic, fls. violet); Berastagi, *Ridley s.n.* Feb. 1926 (K) (Fls. purplish).

Philippines: Luzon, Cagayan, *Cuming 1347* (L); Luzon, Cagayan, Penablanca, *Ramos & Edano 46556* (Sing.).

New Guinea: Lae, Bot. Gard., *Heuz 9827 & 10503* (L).

3. *Salvia coccinea* Juss. ex Murr. var. *pseudococcinea* (Juss. ex Murr.) Back. in Onkrnidfl. Jav. Suikerr. (1934) 561; Back. & Bakh. f. Fl. Java 2 (1965) 628.

Salvia pseudococcinea Juss. ex Murr. in Comm. Gott. 1 (1778) 86; Mansf. in Bot. Jahrb. 62 (1929) 378.

Salvia coccinea (non Juss. ex Murr.) Prain in J. As. Soc. Beng. 74 (1907) 712; Ridl. Fl. Mal. Pen. 2 (1923) 655 (as *Sp. excl.*)

29

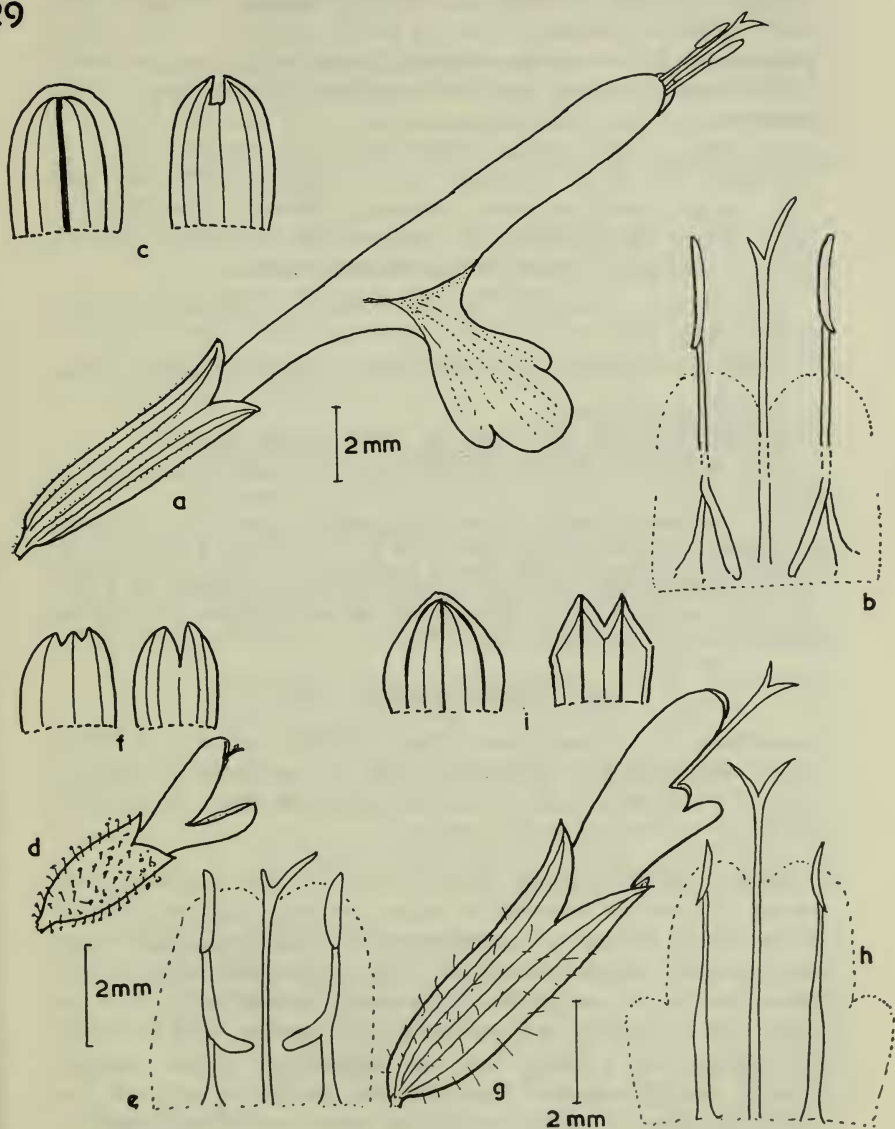


Fig. 29. *Salvia coccinea* Juss. ex Murr. (a-c), *S. plebeia* R. Br. (d-f), and *S. scapiformis* Hance (g-i).

a, d, g. flowers; b, e, h. stamens and portions of styles; c, f, i. upper (left) and lower (right) fruiting calyx-lips; (a-c, Lörzing 11849; d-f, Lörzing 14502, Cuming 1347; g-i, Edano 17973, Ramos 33145).

A slender herb, 60 cm to 1 m high. Stems several, ascending, often branched, finely pubescent (in some cultivated forms with extremely long silky hairs). Leaves membranaceous, ovate or deltoid-ovate, 2.5–3.5 cm long, 1.5–2.5 cm wide, acute, the base truncate or cordate, the margins crenate or serrate; glabrous above, finely pubescent beneath; petioles slender, 0.5–1 cm long, finely puberulous. False racemes terminal; flowers 6–10 in a false whorl; bracts ovate-acuminate, deciduous; pedicels 2–4 mm long, slender, puberulous. Calyx tubular-campanulate, 7–8 mm (in fruit 9–10 mm) long, hirsute, striate; upper lip entire, obtuse; lower lip 2-toothed, the teeth triangular, acute. Corolla 20–25 mm long; tube straight, much exserted, widened upwards; upper lip short, erect; lower lip spreading or recurved, 3-fid. Nutlets narrowly ovoid, 3 mm long, 1.2 mm broad, smooth, brown.

Distribution: A native of tropical America; cultivated in South-eastern Asia.

Ecology: A garden plant, occasionally escaped from cultivation.

Specimens examined:

Sumatra: Sibolangit, Bot. Gard., alt. 500 m, *Lörzing* 11849 (L).

Malay Peninsula: Malaya, *Maingay* 1167 (K); Malacca, *Maingay* 1778 (K.).

Java: Pasoeroean, *Backer* 36769 (L); Sarangan, *Coert* 179 (L); Madioen, G. Lawoe, alt. 1,300–1,400 m, *Elbert* 749 (L); S. E. Java, *Forbes* 756 (L); Pangalengan, *Forbes* 758 (BM, Sing.); Preanger, alt. 1,400 m, *Hochreutiner* 1280 (L); Pangalengan, alt. 1,400 m, *Karsten* 19 (L); Sarangan, G. Lawoe, alt. 1,300 m, *Karsten* 50 (L); Besoeki, *Koorders* 28490 (K); Batavia, *Schiffner* 2503 (L); Preanger, Tjnjiroean, alt. 1,450 m, *Smith* 793 (L).

30. SCUTELLARIA LINN.

Scutellaria [Riv.] Linn. Gen. Pl. ed. 5 (1754) 260, Sp. Pl. (1753) 598; Benth. in DC. Prodr. 12 (1848) 412, in Benth. & Hook. f. Gen. Pl. 2 (1876) 1201; Briq. in E. & P. Pfl. Fam. 4, 3a (1897) 225.

Herbs, sometimes woody below. Leaves opposite, petiolate, rarely sessile. Flowers in terminal or upper axillary racemose inflorescence; bracts minute or conspicuous and foliaceous. Calyx short, campanulate, 2-lipped, accrescent; calyx tube with a large deciduous shield- or pouch-like appendage ("scutellum") above the upper lip; in fruit, at first the lips closed together, then the upper lip falling away together with the appendage. Corolla trumpet, usually sharply recurved from the base and erect upwards, not annulate within, 2 lipped; upper lip often boat-shaped, entire or notched; lower lip broad, 3-lobed. Stamens 4; lower pair longer, the anthers often dimidiate or 1-loculate; upper pair shorter, the anthers 2-loculate. Disk tubular, elongate. Ovary oblique, on a short gynophore; style 2-fid. Nutlets very minute, smooth, granulate or hispid. Seeds more or less transverse, with curved embryo.

Species about 200, nearly throughout the World, (absent in S. Africa). Over 10 species have been described or reported from the Malesian region, only the following 3 species with 4 varieties are recognized in this treatment.

Key to the species and varieties

- A. Flowers mostly 3 and subverticillate (sometimes also 2 and opposite) in a false whorl, radially spreading.
 - B. Leaves membranaceous, generally larger (4.5–6 by 3.5–5 cm); bracts usually linear, 1–2 mm long, inconspicuous.
 - 1. *S. discolor* var. *discolor*
 - B. Leaves chartaceous, generally smaller (3.5–5 by 2–4 cm); bracts usually lanceolate, 3–5 mm long, very prominent.
 - 1a. *S. discolor* var. *cyrtopoda*
- A. Flowers 2 and opposite in a false whorl, the pedicels twisted, nearly in one plane.
 - B. Raceme-like inflorescence terminal and also in the axils of upper leaves; dwarf herb; leaves mostly radical, reniform or rounded, the base often cordate.
 - 2. *S. indica*
 - B. Raceme-like inflorescence usually terminal only; erect or prostrate herb; leaves basically ovate, acute, the base truncate or rounded.
 - C. Tall herbs, often erect; leaves thin membranaceous, usually over 3 cm long, the margins crenate or entire.
 - D. Leaves smaller (3–4 by 1.5–2 cm); rachis of inflorescence often glandulately haired.
 - 3. *S. javanica* var. *javanica*
 - D. Leaves larger (7.5–10 by 3–3.5 cm); rachis of inflorescence often glandulately haired.
 - 3a. *S. javanica* var. *sumatrana*
 - C. Dwarf herb, often procumbent; leaves chartaceous, usually 1–2.5 cm long, the margins subentire or often with 2–3 coarse teeth on each side.
 - D. Leaves 0.5–1.5 cm long, the margins often remotely crenate or subentire.
 - 3b. *S. javanica* var. *luzonica*
 - D. Leaves 2–2.5 cm long (sometimes up to 6.5 cm long), the margins often with 2–3 coarse teeth on each side.
 - 3c. *S. javanica* var. *russeliaefolia*

1. *Scutellaria discolor* Wall. ex Benth. in Wall. Pl. As. Rar. (1830) 66; Benth Lab. Gen. & Sp. (1834) 428, in DC. Prodr. 12 (1848) 417; Miq. Fl. Ind. Bat. 2 (1859) 972; Prain in J. As. Soc. Beng. 74 (1907) 714; Ridl. Fl. Mal. Pen. 2 (1923) 649; Kudo in Mem. Fac. Sc. & Agr. Taihok Un. 2, 2 (1929) 253; Mukerj. in Rec. Bot. Surv. Ind. 14, 1 (1940) 146; Back. & Bakh. f. Fl. Java 2 (1965) 620.

var. **discolor**

Scutellaria heteropoda Miq. Fl. Ind. Bat. 2 (1859) 972 (incl. var. *grandis*) syn. nov.

Scutellaria indica (non Linn.) Bl. Bijdr. (1826) 839.

Small herbs, usually 20–50 cm high; stem hirsute, rarely branched. Leaves membranaceous, broadly elliptic to rotund, rarely ovate, 4.5–6 cm long, 3.5–5 cm wide, sometimes smaller, obtuse or

rounded, the base often rounded-cordate, the margins coarsely crenate, glabrescent or sparsely pubescent on both surfaces; petioles 1–2 (or more) cm long, hirsute. Flowers in simple terminal raceme-like inflorescence 10–15 cm long; 3 (or 4) flowers subverticillately arranged in false whorls not confined to one plane; bracts linear, 1–3 mm long; pedicels 2–4 mm long, pubescent. Calyx cup-shaped, 2–2.5 mm (in fruit 4–5 mm) long, hirsute. Corolla trumpet, 10–12 mm long. Nutlets ellipsoid, 1.2 mm long, 0.7 mm wide, black, echinate.

Distribution: E. India, Burma, Indo-China, Malesia (Sumatra, Malay Peninsula, Java, Lesser Sunda Islands, Moluccas), to S. W. China.

Ecology: In grassland along rivers or in shade and moist spots in forest, from low to medium altitudes (200–2,200 m).

Specimens examined:

Sumatra: Precise locality unknown, *Korthals s.n.* (L) (Type specimen of *Scutellaria heteropoda* var. *grandis* Miq.); Sungei Kumbang, alt. 1,500 m, *Robinson & Kloss* (K).

Malaya Peninsula: Gorge of S. Tras, alt. 200 m, *Burkill & Haniff* 16942 (Sing.); Kedah, Kedah peak, alt. 1,200 m, *Haniff* 606 (Sing.); Kedah, G. Jerai, alt. 1,000 m, *Evans & Gordon* 1055 (Sing.); Kedah peak, alt. 1,200 m, *Haniff* 606 (K, Sing.) (fls. blue); Perak, G. Kubau, *Haniff* 3916 (Sing.); Perak, Jor, *Haniff* 14234 (Sing.); Pahang, Lubok Tamang, alt. 1,200 m, *Henderson* 11000 (Sing.); Pahang, Cameron's Highlands, *Henderson* 11655, 11771 & 17819 (Sing.); Pahang, Sg. Ichat, *Jaamat* 25186 (Sing.); Pahang, Sg. Terolak, *Jaamat* 27591 (Sing.); Pahang, Cameron's Highlands, *Pool s.n.* 1939–40 (Sing.); Kedah, Kedah peak, alt. 1,300 m, *Ridley s.n.* June 1893 (Sing.); Pahang, Telau, *Ridley* 13567 (Sing.); Perak, *Ridley* 16314 (K); Kedah peak, alt. 900–1,300 m, *Robinson & Kloss* 6036 (K); Pahang, Cameron's Highlands, alt. 1,600 m, *Robinson* 11195 (Sing.); Kedah, *Vesterdal* 211 (Sing.); Sira Rimau peak, alt. 300 m, *Yapp* 549 (K).

Java: Java, alt. 1,500 m, *Backer* 5482 (L); Geger Bintang, alt. 1,700 m, *Backer* 13662 (L); G. Beser, alt. 1,050 m, *Backer* 22974 (L); Kangean, alt. 150 m, *Backer* 27500 (L); G. Tjibeber, alt. 1,200 m, *Bakhuizen v/d Brink* 2424 (L); Tjidadap, alt. 1,100 m, *Bakhuizen v/d Brink s.n.* May 1917 (L); G. Menangis, alt. 200 m, *Buwaldá* 3006 (L); Poentjak, *Hallier s.n.* Feb. 1895 (K, L, Sing.) Geger Bintang, *Hochreutner* 1140 (L); Poentjak, *Hoed* 3191 (L); Java, G. Gede, *Horsfield s.n.* (K, U, type specimens of *Scutellaria heteropoda* Miq.) Java, *Junghuhn* 2128 (K); Dieng, alt. 2,000 m, *Karsten* 90 (L); Batavia, G. Salak, alt. 7,000 m, *Koorders* 24130 (L); Preanger, alt. 2,215 m, *Koorders* 36709 (L); Java, *Lobb* 120 (K); G. Gede, alt. 1,400 m, *Ooststroom* 13865 (L); Kapala Tjiburrung, *Reinwardt* (L); G. Gede, *Ridley s.n.* Feb. 1915 (K); Tjibodas, *Sapiin* 2283 (L); Mt. Megamendoeng, alt. 1,400 m, *Schiffner* 2493 & 2495 (L); Bogor, Pasir Tlaga, *Soeganda* 30 (L) (fls. violet); Mt. Menapa, alt. 900 m, *Steenis* 17381 (L); G. Lawoe, *Voogd s.n.* 1920 (L); G. Beser, alt. 1,000 m, *Winckel* 137 (L).

Lesser Sunda Islands: Timor, alt. 1,300 m, *Bloembergen* 3354 (L); Wetar, alt. 600 m, *Bloembergen* 3620 (L); Timor, Koepang, alt. 1,800 m, collector unknown (L); Lombok, *Elbert* 972, 1889 & 2775 (L); Wetar, alt. 150–550 m, *Elbert* 4404 (L); Alor, alt. 200 m, *Jaag* 695 (L); Timor, *Newton* (K); Timor, alt. 1,600–1,750 m, *Steenis* 18316 (L); Lombok, alt. 1,200 m, *Voogd* 2077 (L).

Moluccas: Ceram, *Kornassi* 487 (K, L), 579, 588 & 1010 (L).

A very variable species of wide geographical distribution. Specimens from E. India (on which basis the species was originally described), in comparison with the Malaysian ones, are rather tiny herbs, usually less than 30 cm tall, with rounded-cordate or cordate reniform and small (1.5–2/1.5–1.8 cm) leaves and few-flowered terminal inflorescence.

Type specimens of *S. heteropoda* Miq. (collected by Horsfield from Java) and its variety (var. *grandis* collected by Korthals, from Sumatra) have been examined. They are indistinguishable from *S. discolor*.

1a. ***Scutellaria discolor*** Wall. ex Benth. var. ***cyrtopoda*** (Miq.) Back. & Bakh. f. Fl. Java 2 (1965) 620.

Scutellaria cyrtopoda Miq. F. Ind. Bat. (1859) 973.

? *Scutellaria zollingeriana* Briq. in Ann. Cons. & Jard. Bot. Genève (1898) 104.

Leaves chartaceous, ovate to broadly ovate, 3.5–5 cm long, 2–4 cm wide, acute or broadly acute; the base rounded, the margins crenate-serrate, appressed hirsute above, pilose on the nerved beneath; petioles 0.5–1.5 cm long, pilose; bracts very prominent, the lower ones lanceolate, 3–5 mm long, decreasing in size upwards.

Distribution: Java.

Specimens examined:

Java: G. Lawoe, alt. 1,800–2,000 m, *Backer 6794* (L), Dieng Plateau, *Backer 21592* (L); G. Hijang (Gilp Kriutjing), alt. 2,200–2,700 m, *Bremekamp & Backer 9819* (K, L); G. Lawoe, near the top, *Coert 252* (L); Madioen, 2,900–3,200 m, *Elbert 150* (L); Pasoeroean, 2,300 m, *Gisuis 23* (L); Malabar, *Hermans 581* (L); Java, *Horsfield s.n.* (K, lectotype) Paslereoan, *Jeswiet s.n.*, July, 1929; Dieng, alt. 2,000 m, *Karsten 62* (L); G. Muriah, alt. 600–700 m, *Kern 8610* (L); Jang Plateau, alt. 2,100 m, *Koorders 43406* (L); Priangan, G. Djaja, alt. 2,200 m, *Steenis 4354* (L).

Backer and Bakhuizen (l.c.) regard that the description of *Scutellaria zollingeriana* Briq. (based on *Zollinger no. 2695*, from Java) for the greater part agrees with that of var. *cyrtopoda*.

2. ***Scutellaria indica*** Linn. Sp. Pl. (1753) 600; Benth. in DC. Prodr. 12 (1848), Fl. Hongk. (1861) 278; Merr. Enum. Philip. 3 (1923) 409; Kudo in Mem. Fac. Sc. & Ag. Taihoku Un. 2, 2 (1929) 255; Mansf. in Bot. Jahrb. 62 (1929) 377, (*non* Blume, 1826).

Scutellaria copelandii Merr. in Philip. J. Sc. 7 (1912) Bot. 349.

Small herb, usually prostrate, 20–30 cm tall, often not branched. Stems and branches acutely 4-angular, glabrescent or strigose. Leaves chartaceous, mostly radical, broadly ovate to very broadly ovate, 1.5–2 (–3) cm long, 1.5–2 cm wide, rounded, the base usually cordate, appressed hirsute on both surfaces, the margins crenate; petioles 0.5–1.5 cm long, hirsute and scabrid. Flowers in a terminal, raceme-like inflorescence, solitary or occasionally several; flowers 2 in a whorl, opposite; bracts rounded to ovate, 2–3 mm long, villose. Calyx 1.5 mm (in fruit 3–4 mm) long, glandular-haired. Corolla 12–14 cm long, puberulent. Nutlets protuberant, 1 mm long, 0.6 mm broad.

Distribution: Japan, China, Formosa to Malesia (Sumatra, Java, Philippines, Celebes, and New Guinea).

Ecology: On cliffs and boulders along streams at low and medium altitudes, rather rare in Malesia.

Specimens examined:

Java: G. Ipis, alt. 2,300 m, *Doctors v. Lecuwen 13329* (L).

Sumatra: Aek Moente, E. Coast, *R. si Boeea 9124* (L), Aek Salabat, E. Coast, *R. si Boeea 9583* (L).

Philippines: Zamboanga, Mindanao, *Merrill 8210* (K, syntype of *S. copelandii* Merr.).

Celebes: Masamba, near Aea, alt. 1,000 m, *Eyma 1200* (Flowers lilac. along way edges).

New Guinea: Tufi, Papua, *Hoogland 4590* (L) (flowers pale to deep purple); Babrongko, alt. 95 m, *Iwangin 5241* (L); Cycloop geb, *Lam 7774* (L); Cycloop Mts. alt. 400 m, *Mijer Drees 83* (L) (leaves tinged purplish, corolla violet blue).

The specimen identified by Blume (ad sepes circa Tugu Provinciae, Buitenzorg, *Herb. Lugd. Bat. no. 905, 123–28*) as *Scutellaria indica* L. (as listed in his *Bijdr.* p. 839), should be correctly referred to *S. discolor*. However, in some other specimens cited above, their general habit, leaves, inflorescences, flowers and fruits are indistinguishable from those of the typical forms which was first described from the Orient (not from India) by Linnaeus.

The New Guinea plant tends to have larger and thinner leaves and often several branched stems each possessing a terminal racemose inflorescence. It perhaps represents a form or variety of the species.

3. ***Scutellaria javanica*** Jungh. Java 1 (1853) 661, in *Adnot.*; Miq. Fl. Ind. Bat. 2 (1859) 974; Back. & Bakh. f. Fl. Java 2 (1965) 620.

var. **javanica**

Scutellaria horsfieldiana Miq. l.c. 2 (1859) 974 *syn. nov.*

Subshrub, slender, 60–100 cm high, often branched. Stems and branches acutely 4-angled, pubescent. Leaves thin membranaceous, narrowly ovate to ovate, 3–4 (–5) cm long, 1.5–2 (–3) cm wide, acute or caudate, the base rounded or subcordate, more or less entire, the margins elsewhere crenate or remotely serrate, often only few-toothed; puberulent on both surfaces; petioles 1–3 cm long, hirsute. Flowers in terminal, sometimes also in upper axillary, lax, false racemes, 8–10 cm long; rachis glandulate-hairy, often 2 flowers in a whorl, secund. Calyx campanulate, 3–4 mm (in fruit 5–6 mm) long, hirsute. Corolla trumpet, 14–16 mm long, puberulent, the upper lip notched. Nutlets broadly oblong, flattened, 1.5–1 mm long, black, finely tuberculate and puberulent.

Type specimen: Dieng, Java, alt. 2,100 m, *Junghuhn 34* (L).

Distribution: Malesia (Sumatra, Java, Philippines, Moluccas to New Guinea).

Ecology: in open primary forests, on slopes, low to medium altitudes.

Vernacular names: Aepar-aepar (Java) Riemos (New Guinea).

30

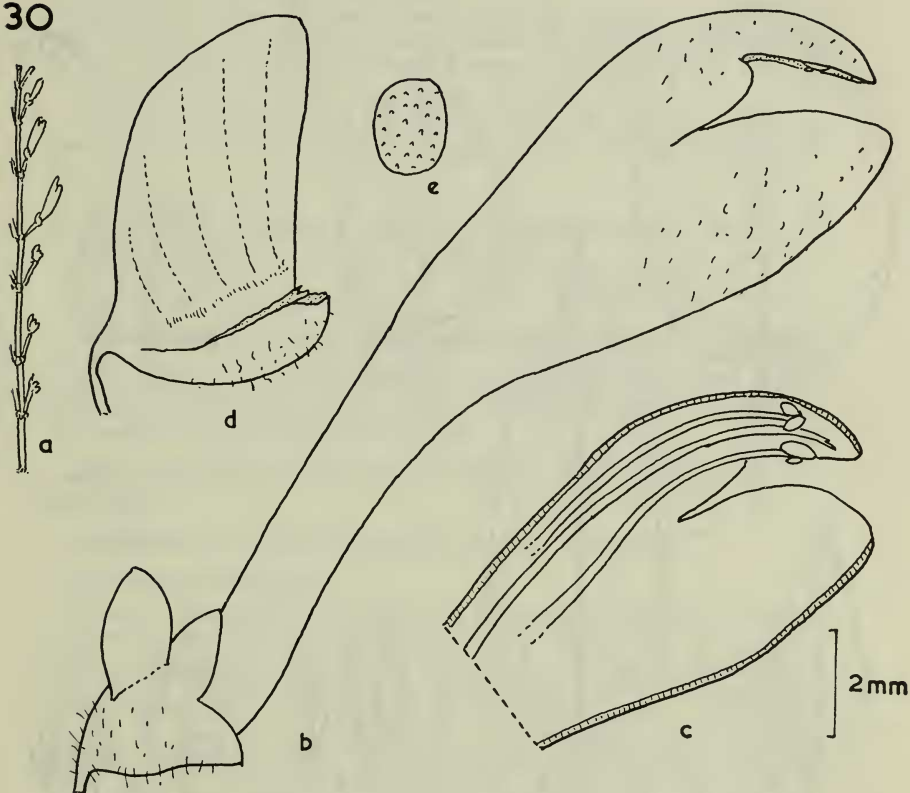


Fig. 30. *Scutellaria javanica* Jungh.

a. Diagram of portion of the inflorescence; b. flower; c. longisection of corolla-limb showing the stamens and style; d. fruiting calyx; e. nutlet. (flower, Junghuhn 34, fruit, Korthal s.n.)

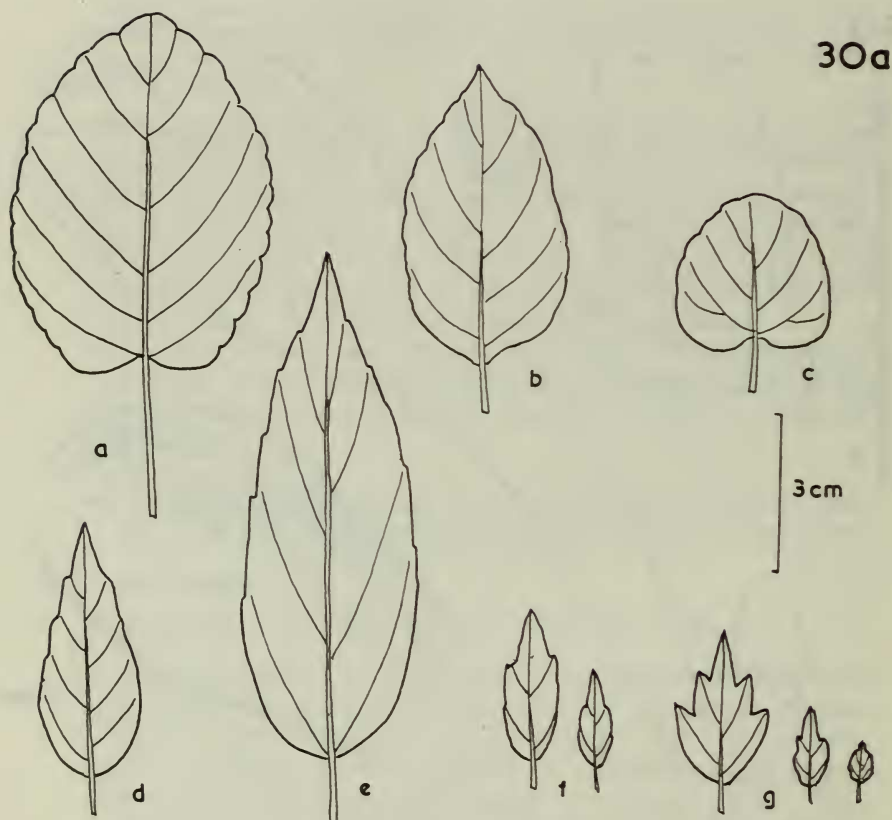


Fig. 30a. Sketches of the leaves of *Scutellaria*.

a. *S. discolor*; b. *S. discolor* var. *cyrtopoda*; c. *S. indica*; d. *S. javanica*; e. *S. javanica* var. *sumatrana*; f. *S. javanica* var. *luzonica*; g. *S. javanica* var. *russeliaefolia*.

Specimens examined:

Sumatra: Padang Highlands, alt. 1,200 m, *Batten Pool* s.n. Aug. 1936 (Sing.); G. Singalang, alt. 1,100 m, *Bünnemeyer* 2958 (L); Kerintji, alt. 1,200 m, *Bünnemeyer* 8187 (L); Kabandjahe, alt. 1,225 m, *Lörzing* 6225 (L); Lake Toba, alt. 700 m, *Lörzing* 16263 (L); Mt. Sago, 900 m, *Meijer* 3183 (L); Benkoelen, alt. 850 m, *Rappard* 143 (L); G. Singalang, alt. 900 m, *Schiffner* 2479 (K, L); Kabandjahe, *Surbeck* 95 (L).

Java: Java, *Horsfield* 330 (K) (Type of *Scutellaria horsfieldiana* Miq.); Dieng, alt. 2,100 m, *Junghuhn* 34 (L) (Type of *Scutellaria javanica* Jungh.); Dieng, *Karsten* 92 (L); Pasoeroean, *Rant* s.n. Oct. 1930 (L); Dieng, G. Prahoe, alt. 2,300 m, *Steenis* 4615 (L).

Philippines: Luzon, Benguet, *Briones* 29796 (K); Mindoro, Mt. Haloon, *Edano* 3503 (L); Luzon, Ilocos, *Ramos* 27180 (K); Mindoro, Mt. Haloon, *Ramos & Edano* 40606 (K); Luzon, Benguet, *Santos* 31835 (K).

Moluccas: Ceram, Koniki, alt. 600 m, *Kornassi* 552 (L).

New Guinea: Papua, Daru Isl., *Brass* 6324 (L); Papua, *Carr* 11253 (L); New Guinea, *Schlechter* 14007 (K); Vogelkop Penin., alt. 100 m, *Versteegh* 7468 (L).

3a. *Scutellaria javanica* Jungh. var. *sumatrana* (Miq.) Backer in Back. & Bakh. f. Fl. Java 2 (1965) 620.

Scutellaria sumatrana Miq. Fl. Ind. Bat. 2 (1859) 974.

Differs from the typical form of the species mainly in the thinner and larger (7.5–10 cm long, 3–3.5 cm wide) leaves and in the sparsely hirsute inflorescence rachis which may reach a length of 20 cm and is not glandularly haired.

Type specimen: Sumatra, bij de Batang Baroes, Teysmann s.n. (not seen).

Distribution: Malesia (Sumatra and the Philippines).

Specimens examined:

Sumatra: Tanang Taloe, alt. 1,100 m, *Bünnemeijer* 1041 (L); G. Singalang, alt. 1,200 & 2,600 m, *Bünnemeijer* 2513 & 2850 (K, L); G. Sago, alt. 1,100 m, *Bünnemeijer* 3689 (K, L); G. Merapi, alt. 1,300 m, *Bünnemeijer* 4589 (L); G. Talang, alt. 1,260 m, *Bünnemeijer* 5604 (L); G. Sago, alt. 1,000 m, *Ichlas* 11 (L); G. Merapi, alt. 2,000 m, *Matthew* s.n. Jan. 1914 (K, L); Mt. Kerintji, alt. 1,800–1,900 m, *Meijer* 6081 (L); Tapianoeli, Toetoeapan, *Rahmat si Boeea* 5929 (L); Tapianoeli, Toba, *Rahmat si Boeea* 10828, 10913 & 11225 (L); Siolak Daras, alt. 1,000 m, *Robinson & Kloss* s.n. March, 1914 (BM, K & Sing.); G. Pakiwang, alt. 700–1,600 m, *Steenis* 3822 (K, L); Gajoe & Alas Lands, alt. 500 m, *Steenis* 8855 (L) (fl. pale blue); Tapianoeli, *Surbeck* 94 & 236 (L).

Philippines: Mindoro, *Conklin* 18814 (K); Mindanao, Mt. Mansamuga, *Edano* 11108 (K).

3b. *Scutellaria javanica* Jungh. var. *luzonica* (Rolfe) *stat. nov.*

Scutellaria luzonica Rolfe in J. Linn. Soc. Bot. 21 (1884) 315; Merr. Enum. Philip. 3 (1923) 410; Mansf. in Bot. Jahrb. 62 (1927) 377.

Scutellaria marivelensis Elm. Leaf. Philip. Bot. 2 (1908) 516.

Ascending, procumbent herb. Leaves chartaceous, lanceolate to broadly ovate, 0.5–1.5 cm long, 0.3–1 cm wide, acute to acuminate, the base subrounded, the margins remotely crenate or subentire. Petioles 2–3 mm long or subsessile Racemes 2–4 cm long.

Type specimen: Luzon, without precise locality, *Lobb s.n.* (K, type of *S. luzonica* Rolfe).

Distribution: Malesia (The Philippines and New Guinea).

Ecology: In ravines, on ridges in mossy forest etc. at medium altitudes above 1,000 m.

Vernacular names: Lupingan, sidit (Philip.).

Specimens examined:

Philippines: Luzon, Bataan, *Borden 2110* (K); Luzon, Benguet, *Elmer 5835* (K); Luzon, Bataan *Elmer 6984* (K); Luzon, Baguio, *Elmer 8650* (K, L); Luzon, *Lobb s.n.* (Type of *Scutellaria luzonica* Rolfe) (K); Philippines, *Loher 6689, 7285 & 7290* (K); Luzon, Bataan, *Merrill 3114* (K); Luzon, Pampanga, Mt. Arayat, *Merrill 3925* (K); Luzon, Benguet, *Merrill 4660 & 4692* (K); Luzon, Bataan, *Meyer 2217* (K); Luzon, Angat, Bulacan, *Ramos & Edano 34087* (Sing.); Luzon, *Vidal 3380 & 3382* (K); Luzon, Bataan, *Whitford 203* (K).

New Guinea: Papua, Kanosia, *Carr 11253* (K) (fls. bluish violet, 1 ft. tall); Lala Rivers, alt. 1,800 m, *Carr 14062* (L) (fls. lilac); Mt. Bainan, alt. 1,500 m, *Cruttwell 888* (K) (fls. bright violet); Milne Bay, alt. 2,100 m, *Cruttwell 1355* (K); Mt. Abree, alt. 2,000 m, *Cuthbertson & Sayer* (K) (Type of *Scutellaria papuana* F. v Mull unpublished?); Finisterre Mts., alt. 1,250 m, *Schlechter 1908i* (K, L).

3c. *Scutellaria javanica* Jungh. var. *russeliaefolia* (Vatke) stat. nov.

Scutellaria russeliaefolia Vatke in Bot. Zeit. 30 (1872) 716; Merr. Enum. Philip. 3 (1923) 410.

Small herb, suberect. Leaves chartaceous, ovate, 2–3.5 (–6.5) cm long, 1–2 (–3) cm wide, acute or acuminate, the base rounded or often subcordate, the margins with 2–3 coarse teeth on each side; lateral veins usually very prominent; petioles less than 5 mm long or subsessile, hirsute.

Distribution: Malesia (The Philippines and Celebes).

Ecology: Often in mossy forest above an altitude of 600 m.

Specimens examined:

Philippines: Basilan Isls. *Britton 477* (L) (flowers blue and white); Mt. Magnas, Luzon, *Edano 19769* (L); Mt. Malinao, Luzon, alt. 800 m, *Edano 34375, 34412* (L); C. Luzon, *Loher 4188* (K); Mayon Volcano, Luzon, alt. 860 m, *Mendoza 18289* (L) (flowers violet); Mt. Iriga, Camarines, *Ramos 22205* (K); Lake Polog, Luzon, *Ramos 23595* (L); Pauai, Luzon, *Santos 31734* (L).

Celebes: Minahassa alt. 600 m, *Koorders 17390* (L).

31. STACHYS LINN.

Stachys Linn. Gen. Pl. ed. 5 (1754) 243, Sp. Pl. (1753) 580; Benth. in Benth. & Hook. f. Gen. Pl. 2 (1876) 1208; Briq. in E. & P. Pfl. Fam. 4, 3a (1897) 260.

Herbs or undershrubs. Leaves opposite, crenate or serrate. False whorls axillary and in terminal spike-like inflorescence. Calyx campanulate, 10-nerved; teeth 5, unequal. Corolla usually with a ring of hairs within; upper lip ascending, concave; lower lip spreading, 3-lobed, the mid-lobe the largest. Stamens 4, subequal

ascending; anthers 2-loculate, the locules divaricate (in Malesian species); filaments glabrous. Style 2-fid, the branches subequal. Nutlets ovoid, obtuse above, subtriquetrous below.

About 200 species, nearly World-wide, except Australia and New Zealand. Only one species extends to Malesia.

1. *Stachys melissaefolia* Benth. Lab. Gen. & Sp. (1834) 538, in DC. Prodr. 12 (1848) 466; Hook. f. Fl. Brit. Ind. 4 (1885) 675; Mukerj. in Rec. Bot. Surv. Ind. 14, 1 (1940) 188; Back. & Bakh. f. Fl. Java 2 (1965) 624.

Stachys oblongifolia (non Wall. ex Benth.) Back. Fl. Java (em. ed.) 14 (1944) fam. 201, 57.

Annual herb, erect. Stems 30–60 cm high, rarely branched, often villous. Leaves thick membranaceous, narrowly elliptic or lanceolate, 4–6 cm long, 1.5–2.5 cm wide, broadly acute, the base truncate or subauriculate, the margins crenate-serrate, densely villose on the surfaces; petioles about 0.5 cm long. False whorls 4–10-flowered, in distant upper axils, forming spike-like inflorescence, to 15 cm long or more; rachis tomentose; bracts narrowly elliptic, 6 mm long. Calyx campanulate, 6–5 mm (in fruit 6–7 mm) long, pilose; the 3 upper teeth slightly longer; the 2 lower teeth highly joined. Corolla 14–15 mm long, strigose without, the upper lip 5–6 mm long. Nutlets broadly obovoid, flattened, 1.8 mm long, 1.6 mm wide, subtriquetrous.

Type specimen: “in montibus Napalensibus”, Wallich 2075 B, (K.).

Distribution: Kashmir to Tibet.

Specimens examined:

Java: G. Gedeh, alt. 1,600 m, Backer 26072 (K, L); G. Gedeh, near Kertasari, alt. 1,700 m, van Steenis 11657 (L).

This interesting Malesian plant was first identified by Dr. Backer as *Stachys oblongifolia* Wall. ex Benth., a species widely distributed from E. India, China, Korea, Japan to Formosa (type specimen: Sylhet, E. Pakistan, Wallich 2076/2, K). It differs from the latter in that the 2 lower calyx-teeth are rather highly connate, and the bracts subtending the flower are much larger (generally 6 x 2 mm).

The general appearance of this plant, on the other hand, is more resemblant to the type specimen of *Stachys sericea* Wall. ex Benth. (from Kamooun, Nepal, Wallich 2077/2, K) which is unfortunately a later homonym of *Stachys sericea* Cav. A species closely related to *S. sericea* Wall. ex Benth. is *S. melissaefolia* Benth. which, according to Hooker f. (l.c. 676), is “usually smaller, more slender and less hairy, silky and leafy than *S. sericea*”. Hooker f. also pointed out, “The specimens described by Benthham under the names of *sericea*,...*melissaefolia*, etc. are so mixed up that it is useless to individualize them”. Mukerjee (l.c. 188) thinks that *S. sericea* Wall. ex Benth. and *S. melissaefolia* Benth. are not specifically different.

For these reasons, the Malesian plant is tentatively referred to *Stachys melissaefolia* Benth.

31

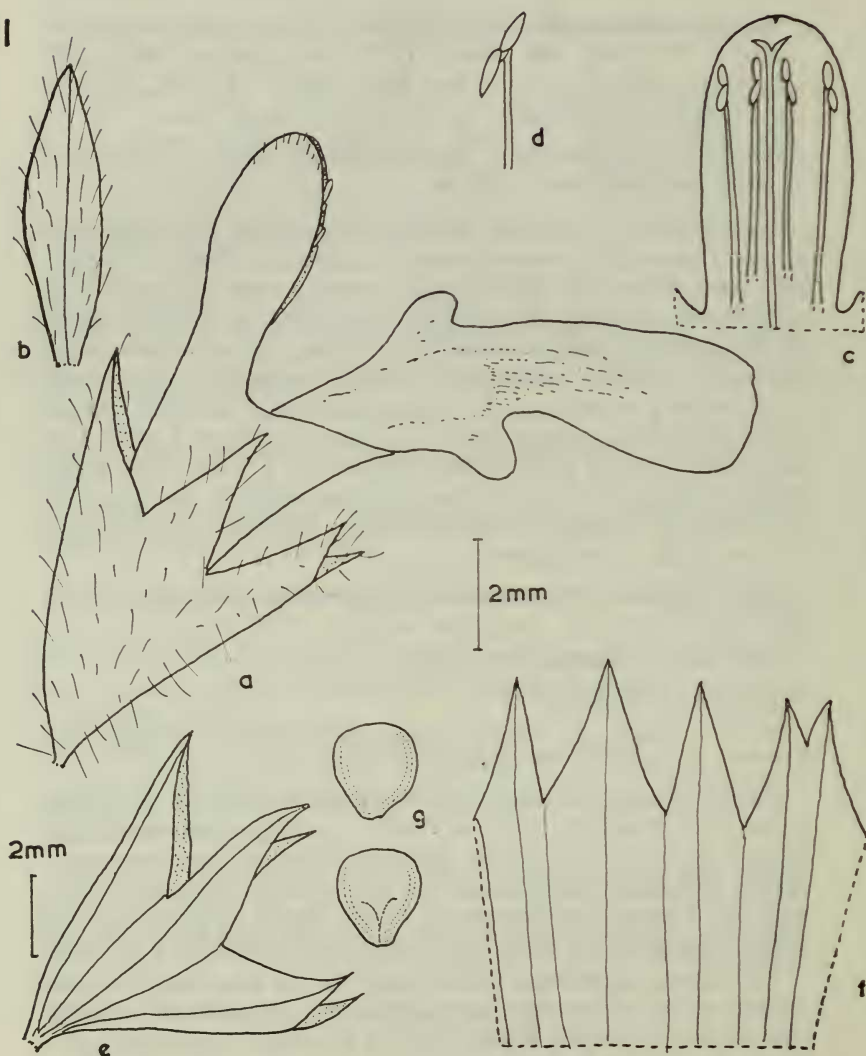


Fig. 31. *Stachys melissaefolia* Benth.

a. flower; b. bract, c. upper lip of corolla with stamens and portion of style; d. stamen; e. fruiting calyx; f. the same, expanded; g. nutlet. (Steenis 11657)

32. **TEUCRIUM** LINN.

Teucrium [Tourn.] Linn. Gen. Pl. ed. 5 (1754) 247; Sp. Pl. (1753) 562; Benth. in Benth. & Hook. f. Gen. Pl. 2 (1876) 1221; Briq. in E. & P. Pfl. Fam. 4, 3a (1897) 210.

Herbs (in Malesian species). Flowers 2 (in Malesian species) in a false whorl, forming terminal and axillary spike-like inflorescence. Calyx 10-nerved, 5-toothed, more or less 2-lipped. Corolla long-exserted; tube not annulate within; limb 2-lipped, the upper lip deeply 2-lobed, seemingly absent, the lower lip 3-lobed, in associate with the two upper lobes forming a 5-lobed piece, spreading and usually concave. Stamens 4, exserted; anthers reniform, 2-loculate, at length confluent. Disc symmetrical. Style 2-fid, the branches subequal. Nutlets flattened, sub-triquetrous, rugose or reticulate; surface of contact large, oblique or lateral.

Species about 100, world-wide in distribution, concentrated in the Mediterranean regions. 2 species extend to Malesia.

Key to the species

A. Leaves chartaceous, narrowly elliptic to very narrowly ovate, very unequal; two lateral calyx-teeth much shorter than the others; corolla 15–20 mm long.

1. *T. quadrifarium*

A. Leaves membranaceous, narrowly ovate to ovate; two lateral calyx-teeth nearly as long as the others; corolla 5–8 mm long.

2. *T. viscidum*

1. **Teucrium quadrifarium** Buch.-Ham. in D. Don, Prodr. Fl. Nep. (1825) 108; Benth. Lab. Gen. & Sp. (1835) 675, in DC. Prodr. 12 (1848) 583; Kudo in Mem. Fac. Sc. & Ag. Taihoku Un. II, 2 (1929) 292; Mukerj. in Rec. Bot. Surv. Ind. 14, 1 (1940) 218.

Erect annual herb, 60–100 cm high; stems and branches velvety tomentose or villous. Leaves chartaceous, narrowly elliptic to very narrowly ovate, 6–9 cm long, 2–4 cm wide, bluntly acute, the base truncate or cordate, often oblique; the margins serrulate, hirsute and slightly rugose above, densely tomentose beneath; petioles 1–1.5 cm long, the uppermost leaves subsessile. Spurious racemes axillary and terminal, generally forming panicles 7–10 cm (to 15 cm or more in fruit) long; bracts ovate, acuminate, often smaller than the calyx. Calyx tubular-campanulate, 3–5 mm long, the upper tooth ovate, broad, the 2 lower teeth lanceolate, 1.5–2 mm long; pubescent outside and with a ring of hairs at the throat. Corolla expanded and recurved, 15–20 mm long. Nutlets ovoid, 1.5 mm long, 1 mm broad, rugose, dark-brown.

Distribution: Himalayas, Burma, Malesia (Sumatra) to S. China.

Ecology: Common in secondary forest, altitudes 1,300–1,400 m.

Specimen examined:

Sumatra: Boven Takengon, Atjeh, *van Steenis 5807* (L), Aug. 1934.

This interesting specimen from Sumatra, matches quite well with the descriptions of *T. annandalei* Mukerjee (in Rec. Bot. Surv. Ind. 14, (1940) 219 type: *Annandale 138*, from Burma), both perhaps representing a form of *T. quadrifarium* with a considerably longer corolla-tube.

2. ***Teucrium viscidum*** Bl. Bijdr. (1826) 827; Miq. Fl. Ind. Bat. (1859) 991 (incl. var. *densiflora* Miq.); Merr. Enum. Philip. 3 (1923) 409; Kudo in Mem. Fac. Sc. & Ag. Taihoku Un. 2, 2 (1929) 295; Mukerj. in Rec. Bot. Surv. Ind. 14, 1 (1940) 218; Back. & Bakh. f. Fl. Java 2 (1965) 618.

Teucrium stoloniferum Roxb. Hort. Beng. (1814) 44, *nom. nud.*, Fl. Ind. ed. 2, 3 (1832) 3.

Teucrium stoloniferum Hamilt. ex Benth. in Wall. Pl. As. Rar. 1 (1830) 58, Lab. Gen. & Sp. (1835) 674, in DC. Prodr. 12 (1848) 583; Miq. Fl. Ind. Bat. (1859) 990.

Teucrium philippinense Merr. in Philip. J. Sc. 7 (1912) Bot. 100.

Teucrium stoloniferum Roxb. var. *typicum* Maxim. in Bull. Acad. Petersb. 9 (1877) 825, *syn. nov.*

Melissa indora Hassk. in Hoev. & De Vriese, Tijdschr. Nat. Gesch. & Phys. 10 (1843) 127; Cat. Hort. Bog. (1844) 132; Miq. Fl. Ind. Bat. 2 (1859) 969.

Annual herb, erect, 30–60 cm high, often branched and stoloniferous; stems and branches hirsute. Leaves membranaceous, narrowly ovate to ovate, 4–7 cm long, 3–4 cm wide, acute or broadly acute, the base cuneate or round and entire, the margins elsewhere prominently crenate-serrate, both surfaces with scattered, weak, white hairs; petioles slender, 1.5–3 cm long. Flowers 2 in a false whorl, opposite; raceme-like inflorescences terminal and axillary, 2–3 cm (in fruit up to 10 cm) long, viscous; pedicels 2–3 mm long; bracteoles pilose, lanceolate, 2–3 mm long. Calyx campanulate, 2–3 mm long, glandular ciliate, the upper 3 teeth ovate to triangular, the lower 2 slightly narrower. Corolla exserted, slender, 5–6 mm long, slightly concave. Nutlets shallowly ridged, ovoid or globoid, 1.5 mm long.

Type specimen: Tugu, Java, *Blume 1809* (lecto-type, L).

Distribution: Himalayas, Malesia to China, Formosa and Japan.

Ecology: In forests and in thickets, alt. 800–1,700 m (in Papua, collected from 4,500 m by Carr).

Specimens examined:

Sumatra: G. Malintang, alt. 1,000 m, *Bünnemeyer 4193* (L); G. Talang, alt. 1,500 m, *Bünnemeyer 5340* (L); Koerintji, alt. 850 m, *Bünnemeyer 7986* (L); Scolak Dras alt. 1,000 m, *Robinson & Kloss s.n.* March 1914 (Sing.); Sandaran Agong, alt. 820 m, *Robinson & Kloss s.n.* May 1914 (K, Sing.); Baraong baru, Sapan, *Robinson & Kloss s.n.* June 1914 (K, Sing.); E. Sumatra, alt. 1,400 m, *Schniffner 2487* (L, K).

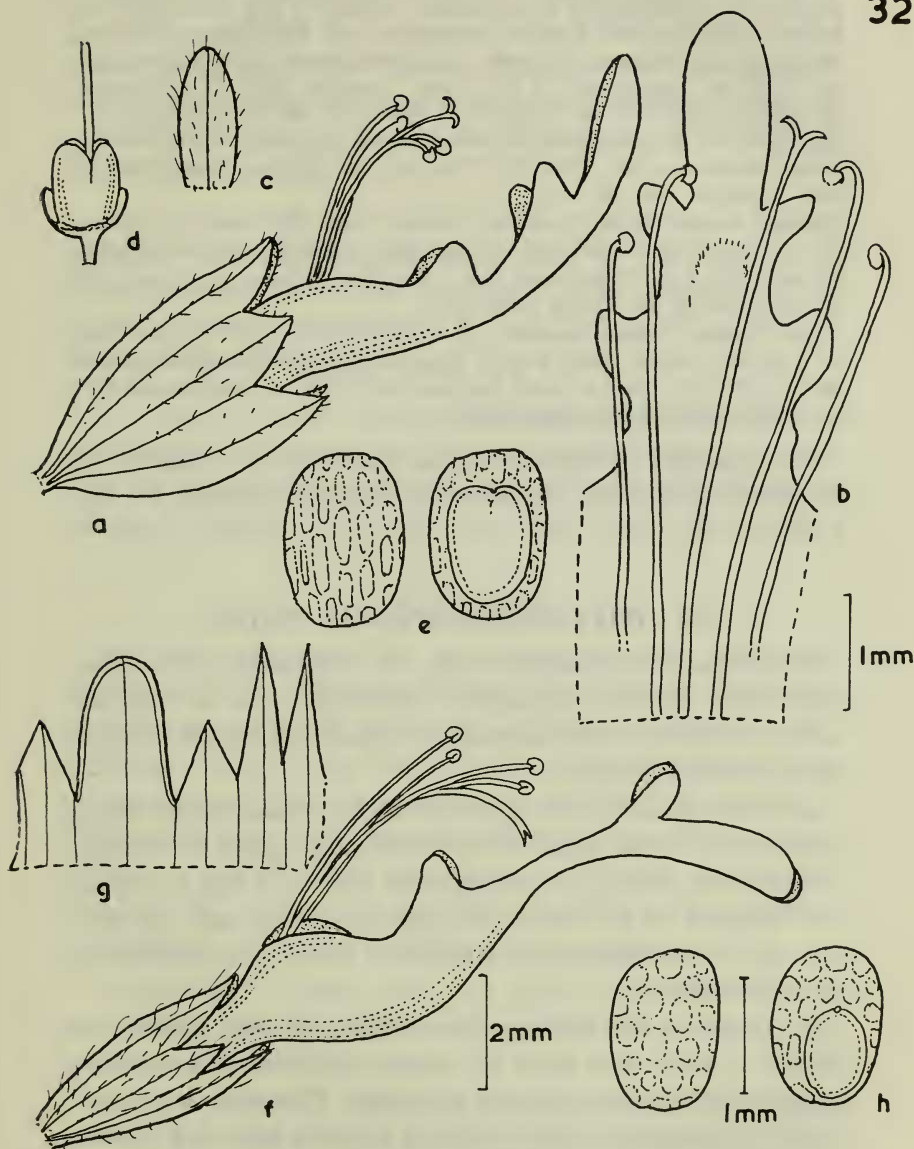


Fig. 32. *Teucrium viscidum* Bl. (a-e) and *T. quadrifarium* Buch.-Ham. (f-h).

a. flower, b. corolla expanded, showing the stamens and style; c. bract, d. ovary; e. nutlet (in 2 views); f. flower; g. upper portion of fruiting calyx expanded; h. nutlet (in 2 views). (a-e, *Blume s.n.*; f-h, *Steenis 5807*)

Java: G. Tjirmai, alt. 900 m, *Backer 4841* (L); G. Wilis, alt. 1,250 m, *Backer 11358* (L); Tjibodas, alt. 800 m, *Backer 13441* (L); G. Boerangrang, alt. 900 m, *Backer 14139* (L); Tjibodas, alt. 1,500 m, *Backer 21492* (L); Tjikidang, alt. 1,000 m, *Bakhuizen v/d Brink 59* (L); Batavia, Tjideroem, *Bakhuizen v/d Brink 2145* (L); Preanger, *Bakhuizen v/d Brink 2784* (L); Batavia, Wanajasa, alt. 1,000 m, *Bakhuizen v/d Brink 4666* (L); Tuku, *Blume 1809* (L, lectotype); Tjibodas, G. Gedeh, *Hallier 192* (L); Sindaglaja, alt. 1,100 m, *Holstvoogd 33* (L); Java, *Horsfield 1424* (K); Preanger, alt. 1,000 m, *Koorders 14953* (L, K); G. Wilis, alt. 800 m, *Koorders 23223* (L), *29767* (L, K); Semarang, *Koorders 27788* (L); Java, *Lobb 122* (K); Tosari, *Ridley s.n.* Jan. 1915 (K); Preanger, alt. 1,000 m, *Smith 840* (L); Java, *Zollinger 822* (K).

Lesser Sunda Islands: Lombok, *Elbert 1583* (L); Bali, G. Abang, alt. 1,500–1,600 m, *Steenis 8027* (L, K, Sing.); Timor, collector unknown (L, lectotype of var. *densiflorum* Miq.); Bali, Mt. Tabanan, *de Voogd 1853* (L); E. Lombok, *de Voogd 2076* (L).

New Guinea: Papua, Isuarava, alt. 4,500 m, *Carr 15338* (L) (fls. lilac, lvs. fragrant); Wissel Lakes Region, *Eyma 4615* (L); Kaiser Wilhelmeland, *Hellwig 626* (K); Trail to Angi gita lake, alt. 1,000 m, *Kostermans 2051* (L) (30–50 cm high, fl. purple-pink).

The reduction of *Melissa indora* Hassk. to the synonym of *Teucrium viscidum* Bl. was made by Koorders [Exkurs. Fl. Jav. 3 (1912) 142].

VI. PHYTOGEOGRAPHICAL NOTES

The species of Malesian Labiatae, 85 enumerated in this treatment, based on their geographical distribution, can be classified under 5 categories. After an analysis of each category, the following conclusions emerge:

(a) There are about 38 species (or 44.7 per cent) widely distributed from S. Asia (mainly Indo-Himalayan region) to Malesia. A number of them (e.g. *Acrocephalus indicus*, *Ajuga bracteosa*, etc.) extended to E. Asia (Sino-Japanese region), and very few (e.g. *Basilicum polystachyon*, *Dysophylla stellata*, etc.) reached as far as Australia.

(b) There are about 30 species (or 35.8 per cent) endemic to Malesia. Among them some are widely distributed (e.g. *Achryspermum densiflorum*, *Cymaria acuminata*, *Paraphlomis oblongifolia*, etc.), others are rather restricted to small areas (e.g. *Coleus macranthus*, *Elsholtzia elata*, *Gomphostemma racemosa*, etc.). Nearly all these endemic species, however, belong to the genera also found in neighbouring regions, especially S. Asia. Only *Acrymia* (monotypic) is an endemic genus.

(c) About 11 species (or 12.9 per cent) are either pantropic weeds (e.g. all the species of *Ocimum*, *Hyptis*) or cultivated plants becoming more or less naturalized in certain areas (e.g. *Coleus amboinicus*, *Pogostemon cablin*).

(d) Only 4 species (or 4.7 per cent) are circumscribed to Malesia (mostly restricted to New Guinea) and Australia. These include: *Anisomeles salviaefolia*, *Ceratanthus longicornis*, *Plectranthus congestus*, and *Plectranthus parviflorus*. They are either the Australian elements which have migrated into Malesia or the earlier Asiatic elements which entered Australia, and for unknown reasons, have disappeared from most parts of Malesia. At least the present distribution pattern of *Ceratanthus* appears to be in favour of the second postulation.

(e) Only 2 species (or 2.3 per cent) are common to Malesia (confined to Luzon, the Philippines) and E. Asia. They are: *Mosla formosana* and *Salvia scapiformis*. These possibly represent typical examples of migration of E. Asiatic elements into Malesia via the Formosa-Philippine track.

To summarize, with reference to Labiatae, the closest floristic relationships of Malesia are with the Indo-Himalayan region. This is in accordance with conclusions drawn by Hooker & Thompson, Miquel, and several others many years ago.

ADDENDUM

After the completion of the manuscript and before the appearance of the galley proof, three important paper concerning the genus *Dysophylla* Bl. have been published. It is decided to add a detailed footnote in the form of addendum rather than to alter the printed text. These three papers are by (1) A. El-Gazzar & L. Watson, (2) H. K. Airy Shaw and (3) R. C. Bakhuizen van den Brink Jr. and C.G.G.J. van Steenis, in *Taxon*, 16: 186–189, 189–190, 1967, and 17: 235–236, 1968, respectively. The sequential and relevant points can be summarized as follows:

a. Following a critical study, the generic differences between *Pogostemon* and *Dysophylla* are re-defined by El-Gazzar and Watson as:

Pogostemon Desf. — Leaves opposite, ovate or narrowly ovate, petiolate, usually more or less hairy or tomentose. Calyx tubular, 5 dentate, Corolla usually subbilabiate, upper lip trifid, lower entire; sometimes minute (3–6 mm). (Crystals present in calyx. Aerenchyma absent in stem.)

Dysophylla auctt.—Leaves verticillate, 3–10 in a whorl, linear, sessile and usually glabrous. Calyx tubular, 5-dentate. Corolla subequally quadrid. (Crystals usually absent in calyx. Aerenchyma present in stem.)

b. As a result, four species of *Dysophylla* Blume formerly classified under section *Oppositifoliae* Benth. (including *Dysophylla auriculata* (L.) Blume and 3 other species not found in Malesia) which possess opposite leaves, should be transferred to *Pogostemon*. Thus:

Pogostemon auricularius (L.) Hassk. in Tijdsch. Nat. Geschied. 10 (1843) 127.

Basyn. *Mentha auricularia* L. Mant. Pl. 1 (1767) 81.

Syn. *Dysophylla auricularia* (L.) Bl. Bijdr. (1826) 825: H. Keng in Gard. Bull. Singapore 24 (1969) 00.

c. Since *Dysophylla auricularia* (L.) Bl. is the type species of *Dysophylla*, with the transference of it to *Pogostemon*, therefore leaving the bulk of the species currently included in *Dysophylla* (these include *Dysophylla stellata* Benth. and about ten other species formerly classified under section *Verticillatae* Benth.) without a generic name. To solve this complication, Airy-Shaw proposes to use *Dysophylla* El-Gazzar & Watson as a new generic name and to assign *Dysophylla quadrifolia* Benth. as the type species and followed by a formal proposal for the conservation of the name. Bakhuizen van den Brink and Steenis, on the other hand, point out that there is already a later synonym for *Dysophylla* sens. auct., namely *Eusteralis* Rafinesque (in Fl. Tellur. 2 (1836) 95), therefore suggest that the alternative is to adopt the latter as the generic name.

d. If Airy Shaw's proposal is accepted, namely to use *Dysophylla* El-Gazzar & Watson as a new generic name and then to conserve it, the type species, however, in my opinion, should be *Dysophylla stellata* (Lour.) Benth., rather than *D. quadrifolia* Benth. as proposed. The reasons have been discussed in the text.